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PUGET SOUND—A SKETCH OF ITS DEFENSES.

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A TRAVELER whirling along in a rail car, at the rate of forty or fifty miles an hour, has but little opportunity to observe in detail the country he passes through. If a military man he can pick out here and there a good position for a battery, but time will not allow him to select a line of battle, cover for his skirmishers, or places for the reserves. In like manner a passenger on a steamboat running over a body of water like Puget Sound, here contracted into narrow channels, there widening out into broad inland seas, bordered with steep timber-covered bluffs, sees only the general features and can form no idea of the great, secure harbors to which the openings on his right and left may lead; how they are protected by the surrounding land; what the depth of the water may be, nor the character of the anchorage to be had. Boarding a steamer at Tacoma, the traveler observes as he leaves Commencement Bay three openings, into any one of which the vessel may enter. Directly before him is Neill's Point, the southern end of Vashon Island. Should the steamer bear to the left of that she would

enter a narrow canal-like passage (Colvos) between Vashon Island and the mainland west of it and continue her way to Seattle and the Lower Sound. This passage is used by vessels in very stormy weather. As she enters Colvos Passage the passenger on her deck, if looking back, would see this passage continued south through "The Narrows," by which steamers reach the waters of the Upper-Sound as far as Olympia. Should the steamer go to the right of Neill's Point and enter the opening before her she would enter a cul-de-sac known as "Quartermaster's Harbor," with Maury Island on its east side. By keeping to the right of Maury Island she would be in the broad main channel of the Sound, and, steaming along over water usually as smooth as an inland lake, pursue the course generally followed to the city of Seattle on the eastern shore of Dwamish (or Elliott's) Bay, distant by water some thirty miles from Tacoma. From Seattle she would steam back along the northern shore, and turning north again enter the main Sound to pursue her way to its mouth, nearly sixty miles farther. Here passing out between the three prominent headlands—Admiralty Head to the north, Marrowstone Point to the south, and Point Wilson to the west she enters the great Straits of Juan de Fuca, across which, in a northwesterly direction, lies the city of Victoria, forty-five miles from Esquimalt Harbor, containing dry dock and navy yard, close by. In this hurried trip the traveler sees nothing but the waters of the main Sound, unless the steamer should happen to touch at Port Gamble or Port Ludlow, and as he runs for the wharf at Port Townsend he naturally asks, as he contemplates the three bold headlands located at the three points of a triangle, whose sides are between three and four miles in length, if this is the only or main entrance to Puget Sound? Port Townsend lies just inside of Point Wilson. The bay is a fine large one with good anchorage and well protected. A few miles up it is the little post of Fort Townsend. Any one making the direct trip from Tacoma to Port Townsend would have about as little idea of the number and capacity of fine harbors in the Sound waters as a traveler on a railroad car would have of the defensive features of the country he passed through.

Leaving Seattle and passing out of Elliott's Bay into the main Sound, a steamer heads for some distance directly north. If a regular passenger steamer bound for Port Townsend, she would keep in the large main body of the Sound, leaving Posses-

sion Point, the south end of Whidby Island, to the eastward. If a steamer on a roving commission, with a captain bent on explorations, she might bear farther to the eastward and enter Possession Sound. This is the eastward channel out to sea, as will be explained later on. The south end of Whidby Island, as it has a very good command over the channel of Possession Sound, and to a certain extent over the main channel (Admiralty Inlet), is a suitable place for a battery. And here it is proper to remark that somewhere in the vicinity of the junction of these two channels is the place for the second line of defenses of the Sound waters. Possession Sound soon opens into a wide bay with Gedney Island near its western shore and looking directly down the Saratoga Passage. Entering a large opening to the north of Gedney Island, our steamer skirts along the eastern shore and we soon find ourselves in the widening harbor of Port Susan at the northern end of which, in high water, there is a narrow, shallow communication with the waters farther north. Steaming around Port Susan, it is found to be a large, commodious, perfectly land-locked harbor, where a great fleet might lie in complete security. Rounding Point Allen we now enter the Saratoga Passage and run into the mouth of Holmes Harbor, up which we go just far enough to see it is a comparatively narrow inlet terminating a mile or two to the south, just beyond which is a point called Double Bluffs, overlooking and commanding the main channel of Admiralty Inlet. At Double Bluffs Point there is a military reservation. A glance at the map will show that a hostile fleet in Saratoga Passage could enter Holmes' Harbor, land a force at its head and take in rear a battery at Double Bluffs. Any works there should, therefore, have their rear well protected. Running north close to the Whidby Island shore we enter Penn's Cove, a safe harbor of comparatively limited capacity, the head of which, it will be seen, is separated by only a thin neck of land from the waters of the Fuca Straits. After steaming around Penn's Cove, and passing in front of the pretty little village of Coupeville, we turn eastward, and, crossing the widened portion of Saratoga Passage, anchor for the night off the town of Utsaladdy, and the following morning pursue our way up the passage which now begins to narrow and is here and there partially intercepted with rocky islands. We find no trouble, however, in going anywhere by using the lead, which shows five, six and seven fathoms of water. As we proceed

northward a large, heavily-wooded island (Hope) closes in the channel to a very narrow space, after passing through which we find ourselves in a beautiful land-locked harbor (Similk Bay). The anchorage is good, the depth of water ample. The soundings develop the fact that to the East of Hope Island the water is shallow, so that we entered this bay by the only practicable passage from the south. Near its head there is a low opening through which, at high tide, water is said to flow to and from Padilla Bay. This Similk Harbor is of especial interest from the fact that it lies directly behind the celebrated Deception Pass. Through this we are to run, as soon as the state of the tide is favorable, for Deception Pass, although almost straight and possessed of ample depth of water, is so narrow that when the tide is running either in or out the water rushes through with such torrent-like velocity as to render the control of a vessel almost impossible. The shores on both sides are solid rock rising almost vertically from the water's edge.

Shortly after the tide turned we weighed anchor and steamed into the Pass, running to the south of Island No. 2, a mass of rock rising gradually from the water's edge and at the highest point, some fifty feet above the water level. Looking back after entering the Pass, this island was seen to completely command its end of the channel and guns placed upon it would thoroughly sweep the Pass for two-thirds of its length. The western end of the Pass is much the narrowest part, the rock on both sides rising precipitously from the water and this, even at nearly slack tide, was whirled about in strong eddies in a way which demonstrated how difficult it would be to steer a vessel through when the tide was running strongly. Just before entering this narrowest portion, another island stands on the left looking well through the rest of the Pass. Guns upon this island would aid very materially in defending this portion of the channel. As we emerge into the open water beyond, Deception or Rock Island is seen directly opposite the mouth, and a fire from that island would reach through the narrow chasm as far as the island just previously mentioned. This narrow, and at unfavorable stages of water, dangerous, pass is the only way for a ship to enter the waters of Puget Sound except the main channel between Point Wilson and Admiralty Head.

Our steamer now ran boldly out into Rosario Strait, the channel of which the British Government proposed as the dividing

line between the two countries, and which we declined to accept as not being the *main* channel. From here we steamed north-westerly across Rosario Strait, and then turning eastward ran close in towards the southern point of Cypress Island, and from there down to Ship Harbor and through the narrow Guemes Channel. After entering Padilla Bay our run was amongst beautiful islands into Bellingham Bay to an anchorage off the town of Watcom. The next day a short run down the coast brought us to Chuchanut Harbor, a rock-bound basin, on the side of which are quarries of valuable stone, which, cut in great blocks from the side of the mountain, are shipped from a wharf only a few feet from the bed out of which they are taken.

From Whatcom we ran south-west across Bellingham Bay, getting a good view of the site of old Fort Bellingham where was stationed, thirty odd years ago, a little company of infantry, which, under its gallant captain (Pickett) came very near being the occasion of a war between two great nations. From Fort Bellingham, Pickett's company embarked to take possession of the island of San Juan, a portion of the territory in dispute between Great Britain and the United States.

Entering Hale's Passage we steamed through and reaching the Rosario Strait once more, ran 'round the northern point of Lummi Island and then down the Strait to a narrow pass between Orcas Island and Blakely Island, divided into two very narrow channels by a good sized island in the middle, and just as the sun was setting we ran up the East Sound of Orcas Island. At the head of the Sound we anchored for the night, and the next day as we ran down the opposite side of the Sound we had a good opportunity to observe the features of this splendid harbor. It is said that when General Scott visited this coast in 1859, he entered this beautiful harbor and declared it was *the* place of all others for a great naval station. Leaving East Sound we wound our way through a narrow channel dotted with beautiful islands, taking a look in as we passed the mouth of the *West* Sound and entering San Juan Channel ran down to Griffin's Bay, where we cast anchor off a smooth gravelly beach where Pickett's little company is supposed to have landed when it took possession of San Juan Island in 1859. Griffin's Bay is an especially fine harbor, with large capacity and fine anchorage ground. It has three entrances—the North and South ends of San Juan Channel and the Upright Channel coming in from the north-east. All of

these are easily defended, and there are military reservations on both sides of them. The bay lies in an indentation on the east side of the southern end of San Juan Island. From the water's edge the ground slopes gently up to quite a prominent ridge extending along the middle of the island; the highest point being about one mile from the landing. Going ashore in a small boat and reaching the highest point of the ridge referred to, we climbed up the steep sides of a little rectangular fort and found ourselves commanding a fine view of both sides of the island and the waters beyond. From this point the land sloped gently off in all directions. From the western shore of the island the Canal de Haro, the boundary line for which we contended and finally secured, stretched off to the north and west to Vancouver's Island of British Columbia, whilst farther southward the Fuca Straits extended as far as the eye could reach toward the Pacific Ocean.

The defensive position selected by Pickett was an excellent one, and gave him complete command in every direction of the approaches to his post. The fort had a profile only on the south, east and west sides, the top of the parapet on the north merging there into the general level of the ridge. Inside of the parapet four level platforms of earth were left on which field pieces could be placed. Regaining our vessel we steamed out of the beautiful harbor, down through the southern end of the narrow Straits and around the southern end of San Juan Island into the waters of Fuca Strait and then over to Victoria.

It may be said generally of all the harbors in this remarkable group of islands that they are good, most of them commodious, with plenty of water, in fact sometimes too much to afford good anchorage.

With the exception of Deception Pass, any guns mounted on any of these islands would serve to defend simply the group and the mainland directly behind them, but would have little or no bearing upon the defenses of the Puget Sound waters.

Directly west of the southern point of San Juan Island lies the city of Victoria, B. C., twenty-five miles distant, and close by Esquimalt Harbor, with its dry dock, navy yard and marine hospital. Neither of these harbors has any defenses of any kind, if we except a couple of small earthworks on the slopes of the shore overlooking the waters of Fuca Straits, said to have been erected during the Fenian excitement.

Almost directly south, twenty-five miles from Victoria and across Fuca Straits, lies Port Angelos, with good anchorage in a harbor bounded seaward by a long sand spit (Ediz Hook), and fifteen miles east of that is New Dungeness with a similar harbor. Southeast of New Dungeness, eight or nine miles, is the opening of Washington Harbor, and five miles east of that is the mouth of Port Discovery, with Protection Island directly in front of it, with a channel on each side. Protection Island was at one time reserved for military purposes, but was abandoned in 1866. Batteries on it would be very essential in protecting the entrance to Port Discovery Harbor. This is a fine, commodious harbor, extending some five or six miles south with military reservations on each side of its mouth, and a third reservation about half way up on its west shore. The harbor is susceptible of excellent defenses. Six or eight miles east of Port Discovery is Point Wilson, on the west side of the main entrance to the Puget Sound waters, here called Admiralty Inlet. The distance from Point Wilson to Admiralty Head, nearly due east, is a little under four miles; whilst four miles south of Admiralty Head is Marrowstone Point, at the head of a peninsula which separates Admiralty Inlet from the harbor of Port Townsend. These three headlands are all prominent bluffs. Heavy rifled guns being placed on them, the entrance could be well defended. Marrowstone Point is the only one of them now a military reservation. Port Townsend Harbor is of great extent, has good anchorage, and is well protected from the prevailing winds. Three miles up it, on the western shore, is the post of Fort Townsend. For defensive purposes the post is useless, and could easily be taken in reverse by an expedition from Fort Discovery in its rear.

Ten miles south of Marrowstone Point is the opening of Hood's Canal, the high bluff headlands on each side being reserved for military purposes. Directly at its mouth is the little harbor of Port Ludlow, and five or six miles south, the somewhat larger one of Port Gamble. At Hood's Head, on the west shore about half way from the mouth of the Canal to Port Gamble, is another military reservation.

Hood's Canal is a remarkable body of deep, narrow water, extending some sixty odd miles into the land and terminating in Lynch's Cove only about three miles from the head of Casey's Inlet, which last is a branch of the upper waters of Puget Sound.

Twenty miles from the mouth of Hood's Canal a high, bold bluff (Hazel Point) projects out, giving full command of the channel and separating it from a large bay lying beyond (Dabop Bay). This is a large, commodious harbor, with deep water and shelving, pebbly shores at the foot of high, wooded banks. The deep indentation extends well to the north, and on the western shore near the head, it is stated, is to be located, temporarily, the terminus of the railroad running south from Port Townsend. From that point steamers are to run up the Canal to a point near the great bend and the railroad continued from there south. In the upper part the Canal lies close in towards the Olympian range, the banks are bold and high and the depth of water ample for all navigation purposes.

Returning now to the middle Sound, we will again make Seattle our starting point. This place, selected thirty-five years ago by Captain George B. McClellan of the Engineers as the best terminus of the northern railroad, is situated on the eastern shore of Elliott's Bay, declared by him to be far superior to any other harbor on the eastern shore of Puget Sound. Next to this he places Steilacoom, and says of it: "It is not so accessible from the straits; it affords a fair harbor for large vessels, and the narrows which cover this harbor are more easily defended by permanent works than are the approaches to Seattle." He adds: "In any future examination it would be advantageous to examine a line leading to Port Discovery. The advantages of that harbor, both as to its situation and its facilities for perfect defense by permanent works, entitle it to consideration. It seems to be fully adapted to the purposes of a great *naval station*."

Across the Sound from Seattle, seven or eight miles distant, is the large island of Bainbridge, behind which is a group of fine harbors, not so large as some we have seen, but of good capacity, ample depth of water, good anchorage, and all connected by narrow, deep channels. Steaming directly west from Seattle, we pass Port Blakely on the right, and Blake Island on the left. Blake Island is a rocky mass of about 100 acres in extent, commanding not only the northern entrance to Colvos Passage, but also looking directly down Rich's Passage leading to Port Orchard; thus forming an important central defensive position for all three channels. The narrow, deep channel of Rich's Passage, some two miles long, gives a good access to Port Orchard, a secure harbor of some thirteen miles north and south, narrow

in places, widening out at intervals, and connected with two lesser bays—Dye's Inlet near the southern end, and Dogfish Bay near its northern. At its northern end it connects, by the narrow Agate Pass at Port Madison, with the main waters of Admiralty Inlet. The north end of Bainbridge Island, a high, steep bluff, forms a good defensive position for the Agate Channel. This whole Port Orchard system furnishes ample accommodation for a very large number of vessels, which could lie here perfectly protected. The shores are variable, sometimes steep and abrupt, at others gradually sloping down to the water's edge. The upper (southern) end of the Port is quite a mile wide and over three miles long. The point of land between it and the entrance to Dye's Inlet is low at first and then gradually rises to the westward where it is forty or fifty feet above the water, considerably broken and covered with timber. The point to the east of Dye's Inlet rises more rapidly and is covered with heavy timber.

It is supposed that the first-named point is the one which the commission of naval officers recently decided upon as a suitable position for a naval station. The place is one easily defended, but a glance at the map shows that any system of defense would be incomplete without placing heavy guns on Hazel Point to oppose the passage of a hostile fleet up Hood's Canal, by which the position could be turned. This position, it will be perceived, is on the mainland in the Great Peninsula included between Admiralty Inlet and Hood's Canal, and the connection between this and the other portion of the mainland is by the narrow neck between Lynch's Cove at the head of Hood's Canal and Case's Inlet. This furnishes an easy connection by rail with the region south of the position.

We have thus passed in review all of the positions for defense of the waters of Puget Sound north of Tacoma; and with the exception of some reference to the Narrows near that city it will scarcely be worth while to examine in detail the various defensible positions in the extensive group of fine harbors and connecting channels constituting the Upper Sound. For if, in case of war, we should fail to successfully defend those portions to which reference has been made in this paper, it is not probable that there would be much need to attempt the defense of that portion lying south of the Narrows. Besides Point Defiance on the eastern side at the foot of the Narrows, there are four reservations close together on the western side, guns upon which should com-

mand very completely the narrow passage for at least four miles. But if vessels were to succeed in reaching this portion of the Sound, there would be but little need for them to run the gauntlet of batteries planted along the "Narrows." By simply entering Commencement Bay a hostile fleet, landing a force at Tacoma, could effectually flank to the eastward all the waters of the Upper Sound.

The importance of these Sound defenses lies in the fact that if they are neglected the whole north-western region is open at once to hostile invasion in case of war.

The possession of Commencement Bay would not only flank the waters of the Upper Sound, but would give the enemy control of the terminus of one great transcontinental railroad at Tacoma; of another to be completed in the near future at Seattle; a connection now in course of construction, with the Canada Pacific north from Seattle, and besides open the route to the Columbia River, and render the capture of Portland possible, thus severing two more of our railroad links with the east and give possession of the road south of California. In other words, the failure to construct Sound defenses will shorten by just so much the *time* allowed us for gathering a force to resist an enemy's advance to the Columbia River.

Having secured a foot-hold on Commencement Bay, the enemy's next move would be southward. From the character of the country his route would necessarily be confined essentially to that followed by the line of the railroad from Tacoma to Portland, using that road as a line of supply. Unobstructed, his march would in time lead him to the Columbia River, crossing which on pontoon bridges, Portland would fall. In passing, it may be well to remark here that if Great Britain is our enemy, supplies and troops would be forwarded not only by the unobstructed waters of the Sound, but by an all-rail route from the Canada Pacific via Seattle to Tacoma.

Now comes the important question, what are we to be doing in the meantime? The country south from Tacoma to Tenino, the railroad junction with Olympia, a distance of thirty-nine miles, is comparatively an open one. In the absence of Sound defenses, knowing that an enemy would have an unobstructed passage to Commencement Bay, the first care of our military authorities would be to provide for disputing the march of a hostile force from Tenino, south.

The country is peculiarly well adapted for defense. Densely timbered with underbrush, and fallen trees, it has but few roads and these are of very inferior character, especially in wet weather. The face of the country is, moreover, quite broken and intersected with numerous streams, one of which—the Cowlitz—is deep and unfordable for some distance north from where it empties into the Columbia at Freeport. Within the distance from Tenino to Kalama, on the Columbia, sixty-six miles, are numerous places where a comparatively small force posted in well selected positions, and properly protected with logs and slashed timber, could hold in check for a considerable length of time a very much superior force. In the case of threatened war, these positions should be selected and marked out by engineer officers, if possible. Those farthest north would be least developed, the lines lengthening more and more as they neared the Columbia so as to accommodate a larger force at each succeeding one. In this region, cavalry would be almost useless. Hence it would be necessary to provide only a small force to be used in reconnoitering and giving information of the movements of the enemy.

If due energy was used in selecting and preparing these positions, the first one south of Tenino could be occupied before the enemy was ready to leave Tacoma; troops and stores being run up on the railroad from Portland, and the next line to the rear be in course of preparation. Each of these lines should have roads cut leading to the rear, and converging from several points on the line to a common point. These would be used to forward troops, artillery, and stores to the line, and to throw these to the rear when the line was abandoned. As they would naturally be used by the enemy in advancing, they would, from being convergent on a single position, be more easily defended against his advance. Each of these positions should be held to the last moment short of sacrificing the command, as every hour gained now would be of importance by giving time for the organization of an army on which the safety of Portland would depend. As each force leaves its position to join the line in rear, the several roads from the abandoned position should be obstructed by felling trees, burning bridges, etc., and the railroad destroyed up to the next line; all bridges being burned, as our forces near the Columbia River, steamers furnished with light field pieces and some riflemen should be kept constantly patrolling the river below Freeport. Should the enemy approach the Columbia

River on the west bank of the Cowlitz, our forces, entirely on the east bank, should hold firmly some position in the vicinity of Freeport and command, if possible, the crossing of the Columbia at the mouth of the Cowlitz; the steamers in the meantime keeping constantly on the move to give notice of any attempt to throw bridges, and to interrupt such attempts as much as possible. Should he elect to approach the Columbia by the east bank of the Cowlitz, all our lines after passing the mouth of the latter stream would be well protected on the left flank by the waters of the Columbia. At some point, then, between Freeport and Vancouver, probably either on the North or South Fork of Lewis River, would be fought a great battle to decide the fate of Portland, if we had taken advantage of the delays caused in the progress of the enemy from Tenino to Kalama, to fully organize and equip an army large enough to cope with the invading force.

Here a cavalry force will gain very much in importance over what it had in our operations up to this time and would be used in protecting our right flank and checking the advance of any considerable body of troops over roads which in this region are increased in number and quality.

After passing south of Kalama, we will no longer have a railroad to depend on for supplies which will have to come then by boat from Portland and be hauled by wagon to the needed point.

We shall be fortunate if, before we are called upon to defend the great North-West against invasion, public attention is so far directed towards the necessity of these sound defenses, as to cause the erection of suitable works, armed with heavy guns, so as to prevent an enemy from gaining possession at once of a body of water on which depends the defense of so large a portion of our territory.

The lack of the Sound defenses, necessarily compels us to adopt the Fabian policy outlined in this paper, simply for the reason that no other course will give us the *time* required for organizing, equipping and placing in position an army powerful enough to successfully resist an invading force. Such a policy, requiring as it does the abandonment of so large a territory to be overrun by an enemy, would be exceedingly distasteful to our people but in our present unprepared condition no other course would be possible.

THE DEVELOPMENT AND USE OF HASTY INTRENCHMENTS FOR INFANTRY.*

By FIRST LIEUT. W. A. SHUNK, U. S. A.

EIGHTH CAVALRY.

THE great development and extensive use of hasty intrenchments were directly due to the adoption of arms of precision and long range for infantry. The introduction of breech-loaders rendered them still more necessary. This fact, however, was not at first perceived, and in the Civil War, which was fought almost entirely with muzzle-loaders, hasty intrenchments were far more extensively used than in the War of 1866, in which one party was armed with breech-loaders; and the same statement applies to the Franco-Prussian War, in which both parties were armed with them. But in the Turco-Russian War of 1877-8, fought also with breech-loaders, hasty intrenchments were more generally used, better constructed and of stronger profile than in any previous contest.

"The whole campaign may be said to have consisted, technically, of the attack and defense of more or less hastily fortified positions."†

IN THE CIVIL WAR.

Hasty intrenchments, as above defined, and as understood in connection with this subject, were first largely used in the American Civil War. Most of the combats in the beginning of the War were fought without them, but the necessity of cover from rifle-fire soon brought them into common use.

Nearly all the troops of both armies had been familiar with the rifle from youth, and they were now armed with one which was effective up to 800 yards. (A few companies were armed with breech-loaders, and their use increased toward the close of the War.)

Under favorable conditions, the fire of these weapons was so

* This essay was selected by a Board of Officers appointed by the Commandant of the U. S. Infantry and Cavalry School, as first in order of merit of those required to be prepared by the student officers (Feb. 1888.)

† Greene, p. 422.

deadly that cover was found to be absolutely necessary within their effective range. Skirmishers took advantage of any cover at hand—if none existed each man made his own cover by lying down and rapidly scooping away earth until his body was concealed from the enemy. Cover thus obtained being found very useful, the idea of the "shelter-trench" was readily evolved from it—enough men to form a line of battle in single rank with tin cups, bayonets, spoons, perhaps a few spades, could, in favorable soil, obtain cover in ten or fifteen minutes—particularly if stimulated by the prospect of a speedy attack.

The "shelter-trench" consisted of a ditch, the earth from which was thrown towards the enemy. It had every variety of profile, from barely strength enough to afford cover to the men lying down, to that of the breastwork affording cover to the men kneeling or even standing in the trench. In timber, it was customary to form a line of trunks of trees, and the work was completed by digging a trench in rear of this line and throwing the earth over and beyond it. Later in the war it became habitual to dig the ditch in front of this line in the ordinary way, unless in the immediate vicinity of the enemy.

Slashings or abattis were frequently placed in front of such works, but other obstructions, entanglements, etc., were seldom resorted to, except in the case of places permanently garrisoned. Flanking arrangements were seldom made. Rifle-fire was so destructive that flanking arrangements and obstacles, though desirable, were no longer so important as formerly.

In the later campaigns of the War, the art of intrenching had become so commonly understood that troops marching or manœuvring in the neighborhood or presence of the enemy, no sooner halted for the night, or in position, than they intrenched. Generally, there was not time to plan carefully the position of such works. The best ground in the general line to be occupied was intrenched; and for each brigade or regiment, that ground was selected by its commanding officer, under general instructions from the commanding general of the army or corps. The works thrown up under such circumstances were about as above described and not like those formerly employed in European wars.

Troops armed and sheltered as above described could inflict terrible losses on an enemy advancing to attack them, while suffering very little themselves; and such works, well manned, were not often taken by front attack.

In order to better understand this development and use of hasty intrenchments, it may be well to briefly mention some of the most prominent facts of the War.

In McClellan's advance against Richmond, he found a strong line of field works at Yorktown, before which he was delayed about a month. Resuming his advance, he found a line of redoubts at Williamsburg, but they were taken without difficulty. At Fair Oaks, a portion of his army fought with success behind incomplete field works. In the "Seven Days' Battles," the Federals often took advantage of rail fences, the borders of woods, trees, inequalities of the ground, etc., and in a few places threw up slight earth-works. But in no case was an entire position or a large portion of one so intrenched. Intrenching a position as soon as assumed had not yet become customary; but the utility of fortifying positions of special importance and the use of rifle-pits had become well understood.

In Pope's Virginia campaign, neither party appears to have made any use of hasty intrenchments. However, at Manassas, Jackson sheltered his men behind a railroad embankment and in a cutting. Pope had sufficient time to intrench his position, but failed to do it.

At Antietam, Lee, on the defensive with inferior forces, did not intrench, though he had ample time to do so and was in a position that could have been greatly strengthened in that way. But a few months later, when attacked by Burnside at Fredericksburg he occupied lines strongly intrenched.

In the West, at Fort Donelson the Confederates had covered the main work by an advanced line of intrenchments occupied by an army of 20,000 men. Several assaults on different parts of this line were repulsed; but in the meantime General Grant extended his right and the Confederate line of retreat was compromised. To regain this line, they weakened their right and centre, reinforced their left and attacked Grant's right, driving it back and again opening the line of retreat. While this was going on Grant assaulted their weakened right and captured a large portion of their works, obtaining a firm footing within their intrenched lines. Grant then reinforced his right and drove back the Confederate left, cutting the road forming their principal line of retreat. Next day the Confederates surrendered the place and about 14,000 prisoners.

The Federal position at Shiloh was not intrenched. There

was plenty of time to build works of almost any strength. The reason why it was not done is thus given by General Sherman: "We did not fortify our camps against an attack, because we had no orders to do so, and because such a course would have made our raw men timid." *

After the battle of Shiloh, Halleck assumed command in person of the army that had fought it, concentrated about 100,000 men and advanced with extreme slowness against Corinth, intrenching every position assumed, and at every halt. Beauregard had fortified that place, but, considering his forces insufficient, retired at Halleck's approach.

The battle of Perryville was fought without intrenchments; but parts of each line were posted behind stone fences.

At Murfreesboro the Confederates intrenched their right and centre before the battle. Having driven back the Federal right, they intrenched most of their new position the following night. The Federals also intrenched a portion of their extreme left; but neither party attacked the works of the other.

Thus it appears that in the first year of hard fighting, three great battles—Shiloh, Manassas and Antietam—were fought without any intrenchments at all; that in all the other battles they were more or less used; and that in the advance against Corinth the idea of intrenching at every halt had received its first illustration.

The next year opened in the East with the battle of Chancellorsville, where Hooker having arrived on Lee's flank, instead of attacking at once, halted and intrenched his front. This line was attacked in flank by Jackson, when a new line was intrenched. Lee's attacks continued, and Hooker finally crossed to the north side of the Rappahannock. Sedgwick, in the meantime, had crossed the Rappahannock and occupied Fredericksburg; but, being unable to join Hooker south of the river, was also compelled to recross it.

At Gettysburg, the Federal position was slightly intrenched in part. At other points, the troops fought behind stone fences as at Perryville. Portions of the line were not strengthened in any way. Lee's assaults on the first and second days of the battle were rather successful than otherwise, but no important advantage was gained. The grand final assault was made on the third day upon a central point of the position, after preparation by

* Sherman's Memoirs—Vol. I, page 229.

artillery. The artificial cover at this point amounted to very little, and probably had but little effect on the result. Pickett's men suffered great losses, but reached the desired point notwithstanding. Reserves, however, had been rapidly accumulated in rear of this point, and Pickett was, in a few minutes, overwhelmed and destroyed.

Lee now withdrew to the Potomac. Finding it impassable on account of high water, he selected and strongly fortified a position covering this point of passage. Meade arrived before this position, but did not attack. Lee crossed the Potomac unmolested. From this time forward his army habitually intrenched every position in which they were exposed to attack. As the War progressed, their works were more and more elaborate. The Federals opposed to them followed much the same plan, intrenching their positions upon taking them and keeping pace with their enemy as regards strength of profile of their works.

In the West the Confederates, generally on the defensive, made during the year a much greater use of intrenchments than did their enemies. They converted Vicksburg and other points on the Mississippi into intrenched camps, proof against assault, all of which had to be taken by blockade. But being unable to maintain themselves in the open country, these places were all speedily invested and taken sooner or later.

Bragg, retiring from Murfreesboro, threw up strong works at Shelbyville and Wartrace and at Liberty, Hoover and Bellbuckle Gaps. Rosecrans turned this line in July, and Bragg crossed the Tennessee.

Rosecrans having crossed the Tennessee and occupied Chattanooga, was subsequently attacked by Bragg, who had been largely reinforced, at Chickamauga. Rosecrans was defeated and compelled on fall back to Chattanooga. On the night of September 19 (first day of the battle), Thomas, commanding the Federal left, covered his front with breastworks of logs and rails. Behind these, his men repulsed several heavy assaults. When the right was broken, however, these works were abandoned for a new position in rear. At Chattanooga Rosecrans at once intrenched. Bragg could not attack at once, and by the time his army was fit to do so, the Federal lines were too strong for hope of success by assault. However, Bragg intrenched in front of Rosecrans and partially interrupted his communications.

In November, Longstreet having been detached from Bragg's

army and the Federals having been largely reinforced, Grant, who had assumed command, determined to attack Bragg. Sherman was sent to attack his right, and Hooker to attack his left on Lookout Mountain. Hooker was successful. Sherman was checked, but Bragg detached most of his reserves against one or the other. Seeing this, Grant ordered Thomas to send forward four divisions of the Army of the Cumberland to carry a line of breastworks at the foot of Missionary Ridge, as a diversion in favor of the other attacks. These divisions did not stop as ordered, but charged up the Ridge, captured two more lines of breastworks and 50 pieces of artillery and broke the centre of Bragg's army which immediately abandoned the field.

Shortly after this, Longstreet was repulsed by Burnside in an assault on the Federal intrenchments at Knoxville.

Thus in the year 1863, the use of hasty intrenchments was far greater than in the preceding year. At the close of the year, all the armies engaged had acquired such a knowledge of intrenching and such faith in its advantages that the practice of intrenching a position, as soon as it was occupied, became general.

The remainder of the War consisted mostly of attacks on intrenched positions or movements to compel their abandonment; and the construction and defense of new works.

In the East, several great battles such as the Wilderness, Spottsylvania Court House, Cold Harbor, etc., besides numerous combats resulted from these movements of the main armies. All involved the attack of intrenchments and they were seldom taken—even when taken the defeated troops, reinforced by reserves near at hand, drove out the victors, as at the Petersburg mine, and at Gordon's attack on Grant's lines at Fort Stedman; or they checked the assaulting force temporarily and obstructed their further advance with new works, as at Spottsylvania Court House.

At Spottsylvania Court House, after fighting through the Wilderness, Grant found Lee's army in his front behind strong works. After severe battles and some successful assaults the flank movement had to be repeated—this time to the North Anna, thence to the Totopotomoy and Cold Harbor, thence across the James and against the works at and near Petersburg. Lee conformed to all Grant's movements, met him everywhere with strong intrenchments and inflicted and suffered severe losses. Finally, he occupied the line Richmond-Petersburg, his front

covered with an intrenched line of great strength. Grant faced him with a line of the same kind almost as strong. Grant's advantage consisted in superior numbers. He continually extended his line to his left. Lee had to extend his line as far to prevent the turning of his flank. But by extending his line, it would become so weak that it might be broken by a strong force, when ruin would follow; if not extended, the flank would soon be turned, when rapid retreat or investment would follow. Counter strokes were costly and never achieved more than momentary success. Finally, the turning of Lee's flank at Five Forks compelled his hasty retreat; and the surrender of his army, a few days later, closed the campaign.

In the West, Johnston intrenched quite as much and as well as did Lee in the East. His positions were stronger naturally—all of them were so strongly fortified as almost to forbid assault. Serious attacks against them were only made twice—at New Hope Church and at Kenesaw Mountain—and both were repulsed. Having superior forces, however, Sherman succeeded in compelling him to abandon his positions by a series of great turning movements. In each case, a force too strong for him to dislodge was intrenched in Johnston's front; and another, equal to his whole army, was directed beyond his flank, as at Dalton, Resaca, Kenesaw Mountain, etc. Johnston was finally forced back to Atlanta.

Hood was now appointed to the chief command, relieving Johnston. He at once assumed offensive operations and on July 20, 22 and 28 attacked portions of Sherman's army but was each time defeated with severe losses. In the latter part of August, Sherman executed another great turning movement. He left Slocum's corps intrenched at the Chattahoochee bridge and, with the remainder of his army, turned Hood's left, defeated Hardee at Jonesboro and cut Hood's railroad communications south of Atlanta. Hood then evacuated the place.

Although the use of intrenchments was so common at this period, it is noticeable that all the battles between Sheridan and Early in the Shenandoah Valley, excepting the battle of Fisher's Hill, were fought in the open field. At Fisher's Hill, Early occupied a naturally strong and well intrenched position. Yet, by a simultaneous front and flank attack, his army was routed in a few minutes. This was, doubtless, due to the demoralization of the defeat at the Opequon a few days before, as the same men

fought well in that battle and a few weeks later at Cedar Creek.

With regard to the relative numbers engaged, it is sufficient to say that no assault upon intrenchments was successful without greatly superior numbers. General Cox says: "Since the office of breastworks is to give the defense an advantage by holding the assailant under fire from which the defenders are covered, the relative strength of the two is so changed that it is within bounds to say that such works as were constantly built by the contending forces in Georgia made one man in the trench fully equal to three or four in the assault."*

* * * * *

"A line of earth-works was often held by a skirmish line alone, with such reserve of troops near at hand as could quickly move to and fill the trench at a menaced point."†

The habitual use of intrenchments in the later campaigns of the War, the method of their construction and the time required for it, their greater strength of profile and other points are described in the following:—

"The character of the intrenchments changed by the natural increase of experience and the education which it gave. It did not take long to learn the advantage which cover gave, when rifled arms had more than doubled the range of effective fire. In the open, a covered line could be sure of crippling an attacking force whilst it was passing over 800 or 1000 yards, so that its power to harm would be gone before it reached the ditch. In the woods, an abattis or entanglement in front of the breastwork produced the same effect by delaying and holding the enemy so long under fire that he was no longer formidable when the obstruction was passed.

"From the combat at New Hope Church onward, it may be said that every advanced line on both sides intrenched itself as soon as a position was assumed. On our side the practical method was this: a division having been moved to a place it was expected to hold, the general in command, by a rapid reconnaissance of the topography, determined the most available line for defense, and directed brigade commanders to form their troops upon it, following the outline of the ground, and making such angles, salient or re-entrant, as it required. The skirmish line

*Cox's Atlanta, p. 80.

†Cox's Atlanta, p. 8

was kept in front, the rest stacked arms a few paces in rear of the intended place for the breastworks, intrenching tools were taken from wagons that accompanied the ammunition train, or were carried by the troops on the movement, and each company was ordered to cover its own front. Trees were felled and trimmed, and the logs often two feet thick, rolled into the line. The timber revetment was usually four feet high, and the earth thrown from the ditch in front varied in thickness according to the exposure. When likely to be subjected to artillery fire, it was from ten to thirteen feet thick at base, and three feet less on the upper line of the parapet. Skids or poles, resting on the top of the revetment at right angles to it, sustained a head-log, a horizontal loop-hole for firing under it being about three inches wide. The skids, when left in place, served to prevent the head-log from falling upon the men in the line, if it were knocked off by a cannon ball. The timber in front was then slashed so as to fall outward, making an entanglement which was too heavy for removal and which utterly broke the formation of any line attempting to pass it. Indeed it would only be painfully and slowly that single men could clamber through it. As the troops became familiar with the work, they were able to cover themselves with an intrenchment of this kind within an hour from the time they stacked arms.

"Circumstances would, of course, vary the character of these lines, and in special cases the engineers would plan particular works. The usual custom, however, was that stated, and the intelligence of the soldiers was such that their eye for a position was often as quick and keen as that of any of their officers. Foreign officers, visiting the Army, often expressed their amazement at seeing the troops of the line doing instantly, and without engineering assistance, what was elsewhere done by a corps of sappers under direction of a scientific staff.

"The Confederate troops were differently situated and proceeded a little differently.

* * * * *

"The general character of the works was the same on both sides. No clear understanding of this remarkable campaign can be had, unless the difficult character of the country and the *formidable nature of these artificial defenses* are remembered." *

The battle of Franklin illustrates some of the above points ;

* Cox's "Atlanta," pp. 81-2-3.

and, occurring when both the contending parties were thoroughly familiar with the construction, attack and defense of hasty intrenchments, it furnishes a fair example of the rapidity with which experienced troops can intrench and the great advantages conferred by such works on inferior numbers.

In November, 1864, Hood was pushing toward Nashville with about 39,500 infantry and artillery and 10,000 cavalry. Schofield, with 24,500 infantry and artillery and 7500 cavalry, was trying to delay him until Thomas could concentrate his forces in Nashville; this done, to fall back on Nashville and unite with Thomas.

Hood hoped to ruin Schofield before he could retreat or be reinforced. He seemed about ready to accomplish it on the 29th of November, having arrived with the bulk of his army on Schofield's flank at Spring Hill, while a portion of the Federal command still remained in Columbia. But Hood allowed his army to sleep within gun-shot of Schofield's line of retreat, and during the night the latter withdrew his entire force. At daylight, Schofield's leading troops were at Franklin and the remainder of his force soon arrived. Hood saw the lost opportunity, and resolved to pursue and to attack Schofield wherever he might be found, before a junction could be formed with Thomas.

Franklin lies in a great bend of the Harpeth. The bridges were found to be in need of extensive repairs, and Schofield saw that, if pushed, he would be compelled to fight where he was or to lose his trains. He therefore began at once to repair bridges and to build intrenchments.

The line selected for defense was about two miles long and stretched from the river above, to the river below, the town. It was on a succession of slight elevations, the general effect being to give a complete command over the ground to extreme rifle range. The Federal troops, who had been working hard for the preceding week, and who had been constantly marching or fighting for twenty-four hours, intrenched this line as hastily as possible, and were then permitted to rest for several hours.

The works were of the general character previously described, but much weaker in profile—friends and foes charged completely over them without difficulty. They had no abattis except at two points: at one, an osage orange hedge; at another, an abattis of small trees. At one point head logs were obtained by pulling down a cotton-gin. There was no revetment at any

point. Epaulments for the guns were provided at several points in rear of the works. On the whole, the works were decidedly inferior to those in common use at that period of the war.

Schofield's troops were posted as follows: on the left, left centre and centre, the 23d Army Corps; on the right, the 1st Division, 4th Corps; on the north side of the Harpeth, the 3d Division, 4th Corps; in front of the left centre, two brigades of the 2d Division, 4th Corps: one Division of the 4th Corps was detached. The total effective force of infantry and artillery was about 22,000 men, of whom 19,000 men were in line. The troops in advance were merely in observation and were repeatedly ordered not to fight, but to retire within the main line at the first indication of an attack. The troops in the main line were posted: in a first line continuous throughout; in a second line, not continuous, but posted in rear of the weak points; and in several reserves.

At 3 P. M. the trains were across the river; and it was Schofield's intention to withdraw after dark if not attacked.

Hood, however, followed with his whole force of infantry and artillery, about 33,000 men.

His lines, being formed on a front of a mile and a half, moved forward to the assault at 4 P. M. To the amazement of everybody, Wagner's brigade, instead of retiring to the main line as ordered, opened fire. The Confederates were checked for a moment, but passed both flanks and, in a few minutes, attacked in front and both flanks, and these two brigades went running to the rear, a mass of fugitives. The Confederates followed on their heels and the Federals in their front could not fire. They surged over the works, the Confederates' first line crossed with them, and a gap was broken in the line equal to the front of two regiments. The two brigades were rallied at the river but took no further part in the battle. They lost more than 1000 men—nearly half the total Federal loss in this battle.

The Federal second line and all reserves on this part of the field immediately charged into the gap—there was a few minutes' *melee*—and every Confederate soldier within the line was dead or captured; and the line was again formed. Nevertheless, the successive lines continued to charge and, though the defensive line was not again broken, the Confederates held the ditch and outside of the parapet the length of a brigade front and could not be dislodged.

Here, however, the Federals rapidly threw up a new work within 25 yards of the old one and there maintained themselves. The Confederates in the ditch could neither advance nor retreat and they refused to surrender. Demonstrations and attacks were made elsewhere to assist them, but all were repulsed. Hood, at last, sent forward Johnson's division of fresh troops, but the fire was so deadly that they could not reach their comrades in the ditch, but were repulsed before reaching it.

On other parts of the line the attack was made with equal determination but was nowhere successful. The combat ceased about 9 P. M. and the men in the ditch gradually withdrew.

At 11 P. M. Schofield began to withdraw his army and retired unmolested across the Harpeth.

Hood's loss was 6300 men, 700 of whom were prisoners. Schofield lost 2300 men, more than 1000 of whom were from Wagner's brigade.

Thus we see that a line of slight works, constructed in a few hours by the men they were to protect, enabled Schofield to save all his trains, supplies, etc., to secure his army from further molestation and to inflict severe losses on the enemy, with only slight loss to himself.

Schofield retreated to Nashville where Thomas was concentrating, and Hood followed. Both parties were strongly intrenched by December 5th, and Hood continued to strengthen his works until attacked, December 15th. Hood's force consisted of 44,000 men of all arms. When attacked, December 15th, he had 33,000 infantry and artillery present.

Thomas had remained in his works covering Nashville, concentrating men and waiting for good weather. December 15th he had about 50,000 men available for the attack. He made a demonstration with 7000 men against Hood's right and with the remainder attacked his left wing and turned his left flank. Hood was compelled to abandon this line; he did so and fell back about two miles, where he intrenched during the night.

Next day, Thomas repeated substantially the same manœuvre. He first attacked Hood's right in considerable force. Hood repulsed the attack but greatly weakened his left to do it. Thomas immediately attacked his left in strong force and broke it. The attack was then renewed against the right and, being successful, Hood's army was driven from the field in rout.

From the history of those actions of the Civil War, in which

the party on the defensive was protected by hasty intrenchments, it may be concluded generally that—

1. The direct front attack, unaided by other means, always caused great losses and was seldom successful. Examples of this as at Vicksburg, Cold Harbor, Kenesaw Mountain, Franklin, etc., are very numerous.

2d. The front attack was usually successful: (a) when aided by a simultaneous flank attack, as at Fisher's Hill, Nashville, etc.; (b) when directed against a portion of the enemy's line which he had weakened, either: (1) for the purpose of gaining an advantage elsewhere, as at Fort Donelson; or, (2) as the result of the assailant's attacks or manœuvres, as at Chattanooga.

3d. The party on the offensive, having superior numbers, could choose between attacking the enemy's position and turning it. In the latter case the defender must: (a) take the offensive against a part of the forces; (b) retreat as did Bragg from Tullahoma, and Johnston from Dalton, Resaca, etc.; or, (c) extend his intrenchments in front of the new attack, as at Richmond and Atlanta. If the defender adopted the third plan, his line ultimately became so weak from undue extension that it might be pierced or turned, as at Five Forks and Jonesboro. The defender must then abandon his line or see his forces enclosed.

4th. For the defense of such works troops were posted behind them in lines varying in strength from a "skirmish line" to a "line of battle," according to circumstances. Reserves were posted under cover in rear of these, in positions from which they could most readily reinforce the line at need. There was no provision for counter attacks, and none having an important general purpose was made.

IN THE WAR OF 1866.

Only the most trifling use was made of intrenchments in this contest. In the great battle of the War (Koniggratz), the only works built were so badly located that they were not occupied at all. In connection with this subject, the history of the War teaches, if anything, the *danger of not properly intrenching on the defensive*, since firearms have become so destructive.

IN THE FRANCO-PRUSSIAN WAR.

Again, in this struggle hasty intrenchments were but little

used. But the immense strength conferred, by their use, on portions of certain positions renders it probable that, if whole positions had been habitually intrenched, as in the American Civil War, the German invasion would have had a very different result.

Experienced officers of the Civil War claimed that "one man in the trench was fully equal to three or four in the assault." This was the conclusion when both parties fought with muzzle-loaders. But in this War, both parties were armed with breech-loaders. The advantage to the defensive was thus greatly increased in any case, and was enormously increased if intrenched. To illustrate, take the battle of Worth.

McMahon occupied a very strong position, a small part of which was intrenched, with about 36,000 infantry and 100 guns. The Germans attacked with forces more than twice as numerous. The result where the line was not intrenched was about what might have been expected from the inequality of numbers; the defenders were defeated and driven from the field, though they fought well. But in the centre, on the slope below the village of Froeschwiller, a line of slight trenches had been thrown up. They were occupied by one brigade—about 4000 men—of infantry, and two or three batteries were posted there. After the guns had been silenced and the trenches shelled for some time by a battery of 120 guns on the opposite plateau of Dieffenbach, distant about 2000 yards and of about the same elevation, this part of the position was assaulted by the 5th Prussian Corps—about 25,000 infantry. Notwithstanding their superior numbers, and the well-known fighting qualities of German troops, they were unable to make any progress in this assault and were several times repulsed with terrible losses. The trenches were finally turned by the 11th Prussian Corps, which had defeated the French right where there were no works. The trenches were then carried and most of the defenders were captured.

It seems reasonable to believe that if the whole position had been intrenched—and there was ample time to do it and to slash the trees where the line ran through woods—it could not have been carried by front attack. It could have been turned, however; but there seems to be no reason why the turning force should not have found itself confronted with new works, the same as in the Civil War.

During the progress of the battles around Metz, the defense

of the village of St. Privat furnished another proof of the power of the combination of breech-loader and shelter trench. The stone walls of the village had been loop-holed and very slight trenches thrown up to the right and left of it. The position was occupied by the 6th French Corps. It was shelled by 180 guns at a range of little more than 2000 yards for half an hour. The Prussian Guard was then sent to the assault in half-battalion columns. *They were repulsed at 800 yards from the trenches with a loss of 5000 men—nearly half the force—in fifteen minutes.*

The 12th Corps was then advanced against the right of this line, partially turning the right flank, and was also repulsed at 800 yards from the position. 144 guns were then moved to within 1200 yards of the French position, where they opened fire, continuing it for about two hours. Both corps then renewed the assault, which was successful.

The terrible artillery fire knocked the stone walls to pieces. The troops in the trenches suffered severely, but were able to inflict very heavy losses upon their enemies before they were finally dislodged.

The universal opinion respecting Bazaine's position on the 18th of August, is that it was a very strong one and that, if it had been properly intrenched, it could not have been taken.

Even admitting this, his situation seems to have been hopeless. His communications were lost and he could regain them only by breaking through the German armies between him and Verdun (which was out of the question); or by crossing the Moselle and retreating to the south. The last might have been accomplished if attempted when the most of the Germans were west of the Moselle and before they had deployed for battle—but not afterward. However this may have been, a judicious use of hasty intrenchments would have made it impossible for the Germans to drive his army into that position, or to seize his communications.

It appears that one of Bazaine's errors lay in not destroying the bridges above Metz, and in not crossing the Moselle promptly and defending the line of that river so as to keep open his line of retreat on Verdun. Having neglected this, and having allowed the Prussians to cross the river and to move against his flank, he should have formed and intrenched his line south of the Rezonville road. He should then have extended his line to the west with the utmost rapidity, intrenching continuously from left

to right. This would have given him superior forces intrenched the first day. During the night he should have hurried troops from left to right, continually extending his line and intrenching it. His opportunity to roll up the German left should not have been abandoned because of a cavalry charge; he should have used his chance to the utmost and then could have formed an advanced line of intrenchments.

By this means, vigorously carried out, Bazaine at least could have saved his army, assured his junction with McMahon and have inflicted on the Germans losses heavier than his own.

It is not likely that the armies at that time existing in France would have been able to do more than seriously retard the Germans, who outnumbered them more than two to one and were probably better troops. But, considering the enthusiasm and national spirit displayed by the French people a few weeks later, and the aptitude of that people for war, it appears probable that the armies of France, manœuvring to keep their communications open instead of permitting themselves to be enclosed, and fighting, for the time being, strictly on the defensive in strong and well intrenched positions, might have prevented their own destruction and might have retarded the Germans until, by absorbing the new levies into existing organizations, they would have been able to bring their campaign to a standstill. Opportunities for the offensive were not wanting. If Bourbaki, with the raw levies, could penetrate almost to Belfort, it is difficult to say what he might have done with an additional force of 100,000 veterans.

So far as hasty intrenchments are concerned, is believed that the distinctive features of the War have been illustrated by the examples given.

The operations of this War further illustrate, confirm and render more emphatic almost every deduction relating to this subject from those of the Civil War, and, in addition, they seem to authorize the following:

1st. The attack of an intrenched position by infantry should always be made in successive lines, or swarms, of skirmishers.

2d. It should always be preceded by a concentrated fire of sufficient artillery to overwhelm the artillery of the defender and to inflict severe losses on his infantry.

3d. If possible, flank attacks should always be resorted to, and when this is done front attacks must be made at the same time

to hold the defender in place and to prevent his detaching to meet the flank attack.

IN THE TURCO-RUSSIAN WAR.

Both parties to this War were armed with breech-loaders, greatly superior to those of the Franco-Prussian War. Both parties had had ample time to profit by the events of a war in which hasty intrenchments were extensively used, of one in which they were not used at all, and of one in which they were sometimes used—always with very favorable results.

The Turks, nearly always on the defensive, intrenched more extensively than either party to any previous contest. They fortified every position they expected to hold. Only once did they fight defensively without intrenchments—when overtaken in retreat on frozen and snow-covered ground; even then they made all possible use of such cover as rocks, fences, ditches, etc.

The Russians, in the beginning of the war, assaulted intrenchments without hesitation; but, after the fall of Plevna, Gourko took all the Turkish lines of works on the Sophia-Philippopolis route by turning movements similar to those of Sherman in the Atlanta campaign. It is true that Skobelev and other generals made successful assaults after Plevna; and it is also true that the respect for intrenchments acquired by the Russians in this war was such that not only their infantry, but even their cavalry, are now provided with intrenching tools.

The Turks made great use of shelter-trenches, but preferred works of strong profile, and always so constructed them if time permitted. Within their works they usually awaited attack, seldom taking the offensive; when they did take it the Russians, usually behind slight trenches or none at all, invariably defeated them.

According to Greene: "The Russians began the campaign relying on their bayonets and despising the spade.

"The Turks, on the other hand, had an evident pride in their fortifications, and a full appreciation, from the beginning, of their value. The characteristic feature of the Turkish works was their solidity and their neatness and finish; those of the Russians * * * were usually as slight as possible and their general appearance was 'slouchy,' as if constructed by men who looked upon such work as servile drudgery."

As General Kiou observes: "It is the nature of the Russian

soldier, when he stops for a month, to instal himself, in the matter of fortifications, as if he would remain but a day; whereas the Turk, stopping for a day, instals himself as if for a month."

"Both sides, perhaps, carried their natural tastes to an extreme; for the Turks constructed more than thirty works that were abandoned without firing a shot to one that was properly defended, and the Russians refused to employ the spade until its lessons had been forced upon them by a very rude experience of the murderous fire of modern breech-loaders from behind trenches. One side erred by excessive prudence and its bad effect upon the *morale* of the men, and the other by recklessness and its attendant slaughter."*

Having crossed the Danube near Nicopolis, the Russians assaulted and carried the field-works and trenches near that place without difficulty, and the garrison of the permanent work then capitulated.

Advancing from that point without properly reconnoitering the country, the Russians stumbled upon a position intrenched and occupied by Turks. Having 7500 men, they attacked the position. It proved to be occupied by 25,000 Turks, and, of course, the attack was repulsed with great loss. A counter attack was made but was not vigorously followed up; had this been done, the Russian force would doubtless have been destroyed. The Russians fell back to some slight trenches and the pursuit was stopped. The Russians lost 2800 men.

A few days later, the Russians, having received large reinforcements, again attacked the same position which, in the meantime, had been greatly strengthened. The Turks also had been reinforced and were still superior in numbers, having 40,000 men to the Russians' 30,000. The works were assaulted at two points, and both attacks were repulsed with a total loss of more than 7000 men. The leading regiment in one of the assaults lost 75 per cent. of its strength.

Such were the results of the first and second battles at Plevna.

The Russians had provided forces to mask the Quadrilateral while their main army should march upon Adrianople; but the case in which a formidable army should be established on their right flank was not expected nor provided for in their plan of the campaign, and, in fact, it brought their operations to a standstill until the following December. They now concentrated troops

*Greene, pp. 432-3.

and abandoned all forward movements until this force should be destroyed. Reserves were called out and the Prince of Roumania was asked to join the Russians with his army, which he did. The Turks continued to work on their redoubts and trenches, making them stronger and more numerous until they had a vast intrenched camp little inferior to a fortress.

The two attacks on Plevna mentioned above occurred July 20th and July 30th respectively.

After the second battle the Russians retired about twelve miles to Pelishat, and there completed some slight works—shelter-trenches for infantry and epaulments for field artillery.

On the 31st of August, Osman Pasha, the Turkish general at Plevna, moved from that place with about 25,000 men and 50 guns and attacked this position. The attack was repulsed, Osman losing 3000 men and the Russians 1000 men. The object of this attack is not known. Osman had at the time between 55,000 and 60,000 men. With the whole force he might have obtained an important advantage. It is the only thing open to criticism for which Osman is responsible in his remarkable operations around Plevna.

In the first week of September the Russian forces in the vicinity of Plevna numbered more than 100,000 men, and their commander resolved to attack that place once more. In order that he might do so in the most advantageous manner, he decided to drive the Turks from Lovtcha that he might attack on the north, east and south simultaneously and without annoyance from the exterior.

The attack upon Lovtcha was made by Prince Imeretinsky with 20,000 infantry and 80 guns. It was held by 15,000 infantry with 25 guns, whose position was fortified by a redoubt, several epaulments and several lines of trenches in front of each.

General Skobelev arrived before this position September 1st. He drove the Turks from an advanced position where he intrenched, covering both infantry and artillery. Next day he drove the Turks from a ridge in his front and intrenched there during the night. This was a repetition of the methods in vogue on both sides in 1864. "The result of Skobelev's efforts was that, when Imeretinsky arrived with the bulk of the troops at the foot of the ridge, he had already gained possession of the dominating ridge east of the town, and had epaulments all ready for 56 guns."*

Early September 3d the Russians opened fire with 64 pieces

*Greene, page 230.

and 4 siege guns with such effect that the enemy's guns were soon silenced and their works greatly injured. So great was the effect of this fire that when at 2:30 P. M. the Russians assaulted, they met with only a slight resistance from the first line; the Turks abandoned it and retired to the redoubt and the second line of trenches. The guns were immediately turned upon the redoubt and the second line, while the infantry sought a new position from which to assault. At 5:30 the assault was made. The Turks abandoned their trenches, sent off all their artillery, but defended the redoubt, which was captured at 7 P. M. by an assault in which all the defenders were killed.

This battle affords an illustration of the preparation for assault by an overwhelming fire of artillery, when the works of the defenders are of weak profile. Without it the numbers of the Russians would scarcely have warranted the hope of success in attacking so large a force in an intrenched position. With it they not only succeeded, but they buried 2200 dead Turks while their own loss in killed was only 320, and their total loss was only 1500; and the Turkish army was so completely demoralized and dispersed that it did not appear in the field again for more than two months.

On September 6th the Russian forces in the immediate vicinity of Plevna and available for an attack on that place consisted of about 74,000 infantry, 364 field guns and 24 siege guns; besides there were 10,000 cavalry and 54 guns horse artillery. The Turks numbered about 56,000 infantry and 80 guns; they had also 2500 cavalry.

Osman's works consisted, at this time, of 18 redoubts and several lines of shelter-trenches. The Russians began to bombard the points of attack September 7th, and continued to cannonade them during the daylight hours of September 7th, 8th, 9th and 10th, and at intervals through each night, and on the 11th until 3 P. M., at first with 108 guns gradually increased to more than 250.

At 3 P. M. September 11, the general assault was made against three principal points; and about 60,000 infantry were brought into action. They were successful at two points, but lost so heavily that they could not continue the attack. The result was almost equivalent to a complete repulse, and cost 18,000 men in killed and wounded. The loss of the Turks also was very heavy—between 12,000 and 15,000 men.

According to Greene: "The Russians were defeated at Plevna, not because the position was impregnable, nor because they did not have sufficient forces, but because they were ignorant of the enemy's position, and failed to concentrate their efforts upon the decisive points." *

From the present standpoint, the noticeable feature of the assault was Skobelev's method of handling his troops. He sent his men forward in reasonably open order, fought his way from crest to crest, penetrated the enemy's position and captured two redoubts. His advance was a repetition of his advance at Lovtcha. Osman concentrated against him superior numbers, attacked him and endeavored to cut off his retreat. Skobelev was compelled to retire; he asked for reinforcements but none could be furnished. In withdrawing, he repulsed five separate assaults, receiving no reinforcements until just before the last assault.

The tenacity with which Skobelev's men held their ground was largely due to the fact that they intrenched every position as soon as they occupied it, "using their copper soup-dishes, bayonets and naked hands, as the supply of spades was very small."

The result of this battle shows us, also, that the preparation by field artillery for the attack of infantry upon an intrenched position is not practicable when the works are of strong profile and are provided with bomb-proofs and traverses. Properly speaking, such works are not hasty intrenchments. Nevertheless, in this case, they were constructed by an army too weak to take the offensive constantly within striking distance of a superior enemy, and they show us how a modern army may begin with shelter trenches and, in a few weeks, construct a fortress.

The Russians made no more general assaults and very few minor attacks. Reinforcements continued to arrive; General Todleben, the great engineer, joined the army, and it was determined to invest the place. To do this both flanks were thrown across the Vid and extended until they met. The whole line was fortified against a sudden attack, and both parties strengthened their works and built new ones until the capture of the Turkish army.

The Turks occupied several fortified places: Gorni-Dubnik, Dolni-Dubnik, Telis and Radomirtza, which, being on or near

* p. 259.

the great road to Sofia, were considered to be so near the army of investment as (for obvious reasons) to require their capture. This brought on several battles.

The works at Gorni-Dubnik were weakest and were first attacked. They consisted of a polygonal redoubt about 300 yards in diameter, with a parapet 4 feet high and 6 feet thick, and a ditch of about the same cross-section. Within this redoubt was a cavalier 15 feet high and 40 feet in diameter on which were 4 guns; without was a lunette and some shallow trenches. The garrison consisted of about 4000 men.

Gourko attacked this position October 24th with about 18,000 men. At 9 A. M. the position was surrounded and 56 guns were playing upon it. The Turks were not well covered and suffered severely from this fire—had it been continued eight hours as at Lovtcha, the assault might have been quite as easy. But at 10 A. M. the artillery fire ceased and an assault was made from three sides which carried everything but the main work. At 3 P. M. another assault on three sides of the work was repulsed. After each repulse, the Russians finding shelter in ditches, etc., remained within from 60 to 400 yards of the redoubt. After dark, the Russians, by a third simultaneous rush on three faces, captured the redoubt. Fifteen hundred Turks were killed and wounded and the remainder captured. The Russian loss in killed and wounded was 3300 men, almost as many as the whole Turkish force.

Comparing this battle with that of Lovtcha, we infer that the slight works of the Gorni-Dubnik position offered to the very superior Russian artillery a good opportunity to "prepare" the infantry assault; and that, by doing it thoroughly, the immense losses of the assailants might have been avoided.

On the same day Telis was attacked by another column of Gourko's force. The infantry of the attacking force consisted of about 3000 men. The Russians brought 12 guns into action, the Turks 4 guns. After an hour's bombardment, the assault was made and repulsed with the loss of nearly one-third of the force. This place was surrounded four days later by Gourko—having been bombarded for three hours by 72 guns at 1500 yards the garrison surrendered without assault. Three thousand prisoners and large stores were captured. Radomirtza and Dolni-Dubnik were now evacuated and the investment of Plevna was completed November 1st.

As before stated, no more assaults were made, but both parties strengthened their works to the last.

On the 10th of December, Osman having crossed to the west side of the Vid in the night, attacked the Russian works on that side with about 40,000 men. He was at first successful, but was ultimately repulsed and surrendered.

"Certainly that must be called a brilliant defense which arrested the Russian advance, and completely paralyzed their whole plan of campaign and all their movements for five months; which caused them to call forth vast reinforcements from Russia and, pending their arrival, to supplicate the aid of a petty principality; which killed and wounded and spread disease among nearly 40,000 of his enemies, and caused the affairs of a mighty empire to be directed during half a year from miserable huts in obscure villages of a foreign land."*

And *all this was due to a judicious use of hasty intrenchments* without which his army would have been defeated and destroyed, or driven over the Balkans, before the middle of September.

Apparently the only serious fault in Osman Pasha's operations around Plevna consisted in his remaining there so long that his army was enclosed by the superior numbers of the enemy. This done, his surrender was only a question of time. It is well known, however, that he was commanded in distinct terms not to retreat under any circumstances.

Had he been allowed to retire in time to save his army, and had he been reinforced by a part of the forces so badly handled in the Quadrilateral, it is difficult to see why he might not have fallen back on Sofia, disputing the advance of the Russians in numerous strong and well-fortified positions, in which that rough country abounds. By this means he could at least have prolonged the War, which at that time, for reasons of diplomacy, was a great object to Turkey.

A most remarkable use of hasty intrenchments, showing the great advantages to be derived by a very inferior force from their use, even when of the slightest profile, since the introduction of modern breech-loading firearms, occurred at Shipka Pass, August 21st to 24th inclusive.

Shipka Pass (so-called) consists of a road running along the top of a ridge, the direction of which is from north to south. On both sides of the ridge, separated from it by wooded ravines, are

* Greene, p. 314.

ridges commanding the middle one and within easy cannon range. The eastern ridge is called Berdek Mountain, the western one Bald Mountain. Sharpshooters on spurs of the main ridges were at long rifle range from the road and commanded almost the whole of the road and the ground adjacent, within the Russian position and in rear of it.

The Russians occupied the main road. It crosses three groups of low hills called in order from north to south the Northern Hills, Central Hills and Mount St. Nicholas, the last named being highest. The Russians were posted during the time mentioned on the Central Hills and St. Nicholas. Their reserves were posted between the hills on what was called the "Isthmus." A portion of the south face of St. Nicholas is a perpendicular rock, and here the Russians had 25 guns. East of the road was a battery of 7 steel guns. The soil between these batteries was rocky, but slight trenches had been thrown up connecting them. On the Central Hills were two four-gun batteries and some shelter-trenches.

The Russian force in this position August 20th numbered about 5000 men, distributed as follows: $5\frac{1}{2}$ battalions in the trenches, $3\frac{1}{2}$ battalions in reserve. On the same day Suleiman Pasha deployed in front of, and in plain view from the Russian position, 25,000 regular infantry, besides artillery and a force of irregular troops.

On the morning of the 21st the Turks placed four guns in position on Berdek Mountain. At noon they assaulted the "steel battery" with about 13,000 men. They were at first repulsed, but attacked again and again in the most desperate manner, rushing up the slope to within a few yards of the trenches. This continued till 9 P. M., and desultory firing continued during the night. During the day a Russian reinforcement of 2500 men arrived.

On the morning of the 22d, the Turks had 18 guns in position: 10 on Berdek Mountain; 8 on Bald Mountain and adjacent ridges, 2 of the latter being on a spur called Woody Mountain in the right rear of the Russian position. Their batteries, in fact, were in front, in rear and on both flanks of the Russians. Throughout the day a continuous fire of artillery and infantry was kept up, but no assault was made. Both parties worked all day at their batteries; the Turks in addition extended their lines by both flanks, and the Russians were almost surrounded by

Turkish infantry; the road, however, remained open, but under fire from both sides at range of from 1500 to 2000 yards.

At 6 A. M., on the 23d, the Turks attacked the position on the east, south and west, and "a most desperate struggle continued throughout this whole day, 7500 Russians being engaged to the last man and trying to hold their own against the 25,000 Turks who came to their assault. During the afternoon the position of the Russians became most critical; their artillery ammunition was exhausted, their losses were enormous, and the men began to lose courage under the demoralizing effect of a cross-fire so long continued, and of the heat and lack of food and water."*

The Russians on the west side of the Central Hills were beginning to quit their lines, most of the officers were killed or wounded, and at this time a column of Turks began a movement looking to the occupation of the Northern Hills, which would have completely cut off the Russians. Seeing this, the senior officers by great exertions induced or compelled the stragglers to return to their lines and resume the fight. The Turks began to waver, and just then (4.30 P. M.) reinforcements appeared and their movement was abandoned.

On the 24th Suleiman Pasha, who had noticed that the Russian reinforcements were not large, kept up a fire of cannon and small arms from sunrise to noon, and then attacked Mount St. Nicholas. In this attack the Turks at first carried the Russian intrenchments, but were driven out by a bayonet charge. So determined was the fight that the leading Turkish battalion (500 men) was destroyed. Both parties suffered severely, but the assault was repulsed and the Turkish attacks ceased, at least for a time.

During this period the *whole position* was not intrenched; but it so happened that the heaviest assaults were made where there were trenches. And it is to be noticed that, while the heaviest attacks were repulsed by men behind works without demoralization and without very serious losses, the lesser ones (by very inferior numbers) were only repulsed at all by the most strenuous efforts of both officers and men, with great losses to both, and by the timely arrival of fresh troops, who naturally made their appearance at that point first.

No doubt Suleiman's general plan is open to severe criticism, but his assaults against the trenches of St. Nicholas and the steel

*Greene, p. 210.

battery were made in overwhelming force, and must have been successful but for the trenches. No one can doubt the success of such an assault had it been directed against the Central Hills, the natural point of attack under the circumstances, where a much weaker one was all but successful.

Both parties continued to hold their old positions, and the Russians fortified theirs throughout with trenches and made covered ways to the rear. A desultory fire of artillery and infantry continued, causing daily losses of a few men.

On the 13th of September this fire was increased by the Turks, and so continued for four days. At 3 A. M. on the 17th Suleiman sent all his infantry forward in an assault which lasted till noon, when the Turks were driven out by a bayonet charge. Three assaults were made against the trenches along the Northern Hills, and each was repulsed by volley firing. This was the last Turkish attack.

The losses were as follows in killed and wounded :

	Russian.	Turkish.
In the assaults of August 21-26.....	3600	11,500
In the assaults of September 17th.....	1000	3000

Again both armies remained in their old positions and attacks ceased, but after the capture of Plevna the Russians were reinforced to 56,000 men, and Radetzky planned the capture of the whole Turkish force, which had been reinforced to 36,000 men.

He divided his army into three parts : One, under his personal command, remained in the old positions ; one, under Prince Mirsky, descended the mountains east of the Turkish position by narrow paths ; the third, under Skobelev, descended the mountains by similar paths west of the Turkish position. Both the latter commands had to abandon all their artillery, except a few "mountain guns," on account of the difficulties of the descent.

Mirsky, reaching his destination on the 8th of January, deployed his troops and attacked, carrying two villages and a line of trenches. Next day he repulsed an attack, and, assaulting in turn, captured a redoubt, but could make no further progress. In the meantime, Radetzky, fearing that the Turks might concentrate against Mirtzky or Skobelev if not occupied, attacked the trenches in his own front and carried two lines of them in open assault, losing 1700 men.

While this was proceeding, Skobelev had descended from the mountains, formed his infantry before the Shenovo redoubts,

captured them in open assault, and thus secured the surrender of the whole Turkish force at Shipka.

This assault is one of the most remarkable since the introduction of breech-loaders. It was made without any preparation whatever by artillery. The infantry was formed in two lines. In the first line two regiments, in the second two regiments and a rifle brigade. They forced their way into the redoubts, and after a fierce fight with the bayonet the Turks in that part of the position (12,000 men) surrendered. In a very short time the commander-in-chief surrendered the remainder of the force. Skobelev's loss was 1500 men and Mirsky's 2100. The losses were very heavy considering the number (25,000) actually engaged.

On this occasion both Mirsky and Skobelev, without overwhelming numbers, and with no preparation by artillery, captured in open assault shelter trenches and strong redoubts, well manned and well defended.

Greene says: "Skobelev's energetic attack as soon as he had got all his men together in the valley, was one of the most splendid assaults ever made, and renders more than doubtful the conclusion which has been hastily drawn from this war (from Plevna particularly) that successful assaults of earthworks defended by modern breech-loaders are impossible."*

It is a sufficient description of these assaults to say that they were all made by successive lines of skirmishers supported by troops in denser formations.

After the fall of Plevna Gourko advanced on the line of the great road to Sophia and Philipopolis. He encountered a number of strongly intrenched positions, but assaulted none of them. Having a superior force, and profiting by the experience of the summer and fall, he turned every one of them just as Sherman turned Johnston's positions in Georgia. On several occasions the Turks used their opportunities for taking the offensive. But the Russians had now learned to build shelter trenches in a very short time, and each attack added to the number of repulses by troops behind shelter trenches armed with breech-loaders.

It is not considered necessary to describe any of these turning movements or assaults. To do so would be to repeat what has been already sufficiently shown.

The same applies to the operations against the forces in the

* Greene, page 356.

Quadrilateral and to those in Asia Minor; and it is believed that the battles, combats, assaults, movements, etc., thus far mentioned or briefly described furnish fair examples of the methods of attack and defense of intrenched positions in use during the War.

It is noticeable that every conclusion drawn from the Civil War and the Franco-Prussian War receives additional illustration and confirmation in this one. In addition, the following regarding the employment of artillery against hasty intrenchments, seem to be warranted by the events of this contest, viz.:

1st. If infantry in an exposed position be protected only by shelter trenches, they may be so demoralized by the concentrated fire of a powerful artillery, continued several hours, that an assault will be reasonably sure of success.

2dly. When infantry is protected by works of strong profile, or by works of weak profile with bomb-proof shelters to which the men may retire, the preparation of the attack by an overwhelming fire of artillery, continuing several days and nights, seems to be of very little use.

No military event has occurred since the Turco-Russian War that throws additional light on this subject, or that requires notice in connection with it.

The importance of hasty intrenchments is now so universally recognized that every civilized nation provides its troops with intrenching tools. The Linneman spade, weighing one and one-half pounds, and carried in a pouch weighing one-half pound, is now adopted by most European nations and issued to infantry soldiers as part of their equipment to be carried on the person. With it the soldier can obtain cover in ordinary soil in eight minutes, and can make a very good shelter-trench in thirty minutes. But it is too small for rapidity in heavier work; a body of troops that could build an ordinary redoubt with the Linneman spade in three and three-quarter hours could do the same work with the ordinary spade in two and one-half hours. For such cases spades and long-handled shovels are carried in the company wagons—axes and picks, etc., are also provided. The Germans issue one Linneman spade to every four men, the Russians and Austrians twice as many. The number of large spades is in most cases equal to one-fourth the number of small ones; picks and axes in sufficient numbers are provided also.

All the above nations require their cavalry to carry intrench-

ing tools in their company wagons and the Russians have, in each cavalry division, mounted pioneers and sappers whose business it is to clear (or destroy) roads; to hastily fortify important advanced points that they may be held until the arrival of infantry, and to discharge other duties of the same kind.

Thus we have seen that hasty intrenchments originated in the absolute necessity of cover from the fire of rifled arms; that their use increased with every improvement of those arms; and that their importance is now universally recognized and provision made for their prompt and skilful construction at need, in the armies of all civilized nations.

In conclusion, we may say that hasty intrenchments will doubtless be used for the same purposes and under the same circumstances in the future as in the past. And as all armies will henceforth march to battle prepared to intrench, we may expect that in the next war the party on the defensive will, in the presence of the enemy (or in his vicinity) always intrench his entire position so that it may be held by as few men as possible, thus holding a stronger force in reserve to reinforce points severely pressed, to oppose turning movements, or to take the offensive should opportunity offer. And we may expect the party on the offensive to thus particularly strengthen the defensive parts of his line against counter attack, in that way providing a stronger force for the main attack.

It can hardly be expected that hasty intrenchments will ever be used more skilfully or more freely than in the American campaigns of 1864-5 and in the Turco-Russian War. But, as every man is now provided with the means of intrenching himself, and as the importance of such works is now generally understood, it is to be expected that their use will be generally greater in the future than in the past.

DESERTION IN THE UNITED STATES ARMY.

GRADUATING ESSAY OF LIEUT. WILLIAM D. McANANEY,
NINTH CAVALRY, AT THE U. S. INFANTRY
AND CAVALRY SCHOOL.*

We have only found that men enlist, become discontented, and leave usually in the first and second years of their enlistment.—Report of Brig.-Gen. Stanley, 1884.

“WHAT causes desertion in our army?”

This question has been asked for years, and there has been no lack of answers. They have come from every source. General officers, in their annual reports, each year offer solutions of the question. Department Judge-Advocates have compiled long tables of statistics in their endeavors to throw new light upon the subject. Field and line officers have contributed to the list; and non-commissioned officers and privates have given their views and opinions in the columns of our various Service journals.

The list of causes assigned, and of remedies suggested would alone exceed the limits of this paper. The principal causes assigned by various writers are, poor food, too much manual labor, tyranny of officers, ill-treatment by non-commissioned officers, lack of education in the rank and file, insufficient pay, and excessive length of the term of service.

In adding my answer to the list, I wish it understood: 1st. That I deal only with desertion in the near past and in the present. 2d. That my ideas on this subject are the offspring, and not the fathers, of the facts which I have collected. 3d. That my opinions are not alone derived from my own experience and observation, but from consultation with others, both officers and enlisted men, whose length of service far exceeds mine.

*This essay is one of five recommended for publication by a Board consisting of the Instructors in the Art of War. Priority of publication is not intended to give precedence in merit to any one of the five papers. The Board does not assume responsibility for any of the views expressed by the writers. The topics of the graduating essays are generally restricted to subjects relating to strategy, tactics, and military history; but any important theme relating to military administration or our National military policy is allowed, subject to the approval of the commanding officer of the School.

The calculations in official reports showing percentage of desertions are almost invariably based upon the allowed strength of the Army; but as a large portion of our troops are re-enlisted men, who rarely desert, such calculations evidently do not show the extent of the evil. Let us instead compare the number of desertions in a given year with the number of recruits enlisted in that year. By this method we find that in 1884 the number of desertions was 42 per cent. of the number of recruits enlisted; in 1885 it was 43 per cent.; in 1886 42 per cent.; and in both 1887 and 1888 38 per cent. In other words, there have been more than four desertions for every ten recruits enlisted during the past five years.¹

The financial importance of these losses has been so repeatedly set forth that it need not again be shown. But there is one element of danger to the Army that seems not to be generally considered. In the past five years we have had more than 13,000 deserters;² a small percentage of these have, in various ways, been returned to the Army, but the larger portion are now in civil life. They are scattered through the various States; nearly all of them have votes, and every man has *some* influence.³ *Those votes and that influence may some day help to decide important questions for the Army, and perhaps have an injurious effect on the military policy of the Nation.*

There can be no doubt that each of the various causes assigned as "the one fruitful cause of desertion" has contributed to the general result. But investigation shows that no one of these causes is co-extensive with desertion. The Army is generally well-fed. It is true, however, that some companies fare far worse than others, but desertions occur in both. The quantity of food is always sufficient, and the quality good, whatever may be lacking in variety; and I do not believe that any man now deserts on account of poor food.

Excessive fatigue is often urged as the prime cause, and yet in the post of Fort Leavenworth $6\frac{1}{10}$ per cent. of the enlisted strength deserted during the last fiscal year, and during that year there may be said to have been no fatigue in this post.⁴

Tyranny of officers and ill-treatment by non-commissioned officers is a cause often assigned. Yet Captain J. G. Bourke, Third Cavalry, special inspector upon the subject of desertions, says: "I have not found any instances of ill treatment, although great pains were taken upon this point."⁵ Speaking from my own

observations in ten years' service, more than half of which was as an enlisted man, I agree with Captain Bourke.

It has been suggested (not as a special remedy, but as a sort of tonic) that by educating the rank and file of the Army we would cure desertion. When we reflect that at the outbreak of the late War defections from the Army were confined to the commissioned, and, presumably, better educated portion, while the enlisted portion, to a man, remained loyal, it is hard to see the force of this suggestion. The experience of the world proves that education rarely brings content, but rather the reverse, and records of boards of survey show that the deserter is generally a well educated man.⁶

Increase of pay has been also prescribed as a remedy for desertion. Increase of pay would probably bring more men to the recruiting office, but would hardly prevent desertion. The man who intends deserting to-morrow might be kept in the Service by raising his pay from thirteen to seventeen dollars per month, but it must be *his* pay alone that shall be increased; if all his comrades receive the same increase he no longer feels rich by comparison, and "to desert or not to desert" again becomes a question entirely independent of pay.

It must be considered that the pay of the private is already liberal, not only by comparison with other armies (he is the best paid private in the world), but liberal as compared with the pay of unskilled labor in civil life.⁷ "Thirteen dollars per month" seems small pay, until we reflect that in addition the soldier receives board, lodging, clothing and medical attendance; and that his pay is constant, whether on duty or off, in sickness or in health. Then he has other advantages which must be considered. The commissary cheapens to him the price of many luxuries; in the reading-room he has access to newspapers from all parts of the United States, and he may choose from the hundreds of volumes to be found in every post library.⁸ These privileges the civilian either enjoys not at all, or only by payment of some fee which, large or small, must be considered in comparing their respective wages.

But it is argued that an increase of pay would secure a better class of recruits, and that it would cause men to look upon the Service as a life calling. When all other explanations fail, "carelessness in recruiting" is made to account for the prevalence of desertion; and nine of every ten writers on the subject

advocate securing "a better class of recruits" as the final remedy. I cannot coincide with this statement. Before entering the Service I lived for some time in the East, West and South; since then I have been stationed in Texas, the Indian Territory, Kansas and Nebraska. Having always tried to observe my fellow men, I think I may claim some knowledge of the subject. I do not think that a better class of recruits can be secured, no matter what the pay, because, in my opinion, *no better class exists*. Bear in mind that it is not *alone* mental, moral or physical qualifications that we require in the recruit, but *a combination of all three*. And, all three to have due weight, the enlisted men of the United States Army will bear comparison with any class of men in the world.⁹

As for men enlisting with the intention of remaining in the Service for life, a slight knowledge of human nature teaches that few men, possessing the qualifications we demand, will ever adopt, as a life calling, one which requires perpetual celibacy.

Reduction of the term of enlistment has been strongly urged as the great remedy for desertion. This must be regarded as a concession, not as a cure, and, for military reasons, only to be adopted as a last resort.

A systematic attempt to investigate the subject of desertion was first made in 1882, when orders from the Adjutant-General's Office directed that a Board of Survey be called in the case of each deserter, to ascertain, if possible, the cause of his desertion.¹⁰ It was expected that by this means the question "Why do men desert?" would be satisfactorily answered: and the annual reports for the following year were eagerly awaited. It is needless to say that these expectations were not fulfilled. The annual reports of Dept. Commanders for 1883 and 1884 show that in only about 33 per cent. of the cases was any probable cause assigned; while among the causes given "dissatisfaction" appears more frequently than any other.¹¹ It is evident that assigning dissatisfaction as a cause for desertion is equivalent to saying that a man is blind because he cannot see. Therefore, eliminating "dissatisfaction" from the list of causes, we find that Boards are unable to assign any probable cause for about 80 per cent. of the cases investigated.

If we consider the situation we shall not wonder at this lack of success.—The man has gone. Why he went no one knows, except, possibly, some intimate friend in whom he confided, and

that friend will not care to violate his confidence. The Board cannot examine men under oath; but, even if it could, the result would, doubtless, be the same. The whole thing becomes a matter of opinion, and the finding of the Board is of about the same value as that of a coroner's jury in a case where the remains are missing.

Another source of information is found in the statements before courts martial, of deserters who have been apprehended. If we believe their stories, we must conclude that each earned a martyr's crown before deserting. But investigation rarely confirms their statements.

I do not believe that one out of four deserters *can* tell exactly why he deserted. If asked, however, they always state some cause:¹²—for only poets and fools are willing to acknowledge that they do not know the reasons for their own acts.

The quotation with which this article opens tells the result of investigation made by one who had exhausted official inquiry.¹³

But where inquiry fails analysis may succeed. Let us, therefore, attempt to analyze this problem:—

The object which all men seek to pursue in life is their own happiness. All actions are directed to this end. Therefore, when a man abandons one occupation for another it proves that his action is the result of a mental comparison, and that the advantages offered by the new employment appear to him greater than those he enjoyed in the old, or, as commonly stated, he is trying to "better his condition." But when a man abandons one employment with no certainty of finding another, and, as a consequence of his act, incurs the risk of severe punishment, when he flies from the "ills he has, to those he knows not of," it shows that there has been no mental comparison, but that he has simply found the life he flees from intolerable. That it is not intolerable to others is of no weight; men pursue happiness by different paths, and the advantages, or disadvantages of a certain kind of life are things which each man determines for himself. That some men are, by nature, fickle, and become dissatisfied for trivial reasons, cannot be denied; but no one will contend that 40 per cent. of the recruits we enlist are of this nature. Judging both from my own experience and that of others, I believe that *of every one hundred recruits enlisted ninety-eight intend honestly to serve their term of enlistment.* And I think that any man who

has ever served as a non-commissioned officer will agree with me in this statement.¹⁴

Assuming this, it follows that there must be something in the conditions of a soldier's life which renders it unbearable to many. What that something is, we must learn, not by study of statistical tables, not by asking certain men why other men have deserted, nor by inquiring the reason for their act from deserters themselves, but by an examination of the daily life of the soldier, considering his duties, his recreations and his associations.

Let us take the case of a recruit enlisted at a post and assigned to a company. A non-commissioned officer is detailed to instruct him in drill, and for three or more hours per day he is practised in the setting-up drill, the facings, and the manual of arms. How tiresome these exercises are, we, who have practised them, know. Yet, though this drill lasts for a month or more, the recruit rarely deserts at this period. He does not appear to become disgusted and weary with the constant repetition of these exercises. In fact, after his drill for the day has ended, he is often seen alone practising the manual of arms.¹⁵ At last he is pronounced ready for duty as a private, and is detailed for guard. His first guard is always an event in his life. He strives to learn his orders exactly, and to do his duty well.

Here then, at the end of about two months' service, we have an energetic and contented soldier. But at the end of six months, we often find him a listless, discontented creature, cursing the Service, or possibly already a deserter. What has caused the change? It may be answered that "the novelty of the life has worn off," but this can hardly be called a sufficient reason, for novelty passes from all things; and mechanics do not abandon a trade because their apprenticeship is over.

The change is due to the fact that, though physically well cared for, often, mentally and socially, he is starving. *A struggle is going on in his breast; on the one side are his mental and social needs, on the other, his sense of duty and his fear of punishment; and on the issue depends whether he will become a deserter or remain a soldier.*¹⁶

The duties which employ his body do not occupy his mind. He no longer takes any interest in them. Why should he? On drill he can obey the commands "Fours Right," and "Fours Left," "Present Arms," and "Carry Arms," quite as well as the

man on his right, who has been doing that same thing for fifteen years. He will never be able to do it any better, or, at any rate, never well enough to be excused from a single hour of it, no matter how well he may do it. The man on his right learned the manual of arms in 1873, but on rainy days must still drill in barracks. Practice brings no improvement, or, if it should, improvement brings no exemption from practice. What interest is possible?

On other duty it is much the same. On fatigue he finds that the quantity of time, not of work, is considered. If he do one hour's work in eight he is not censured, as long as he "keeps moving." And if he should do eight hour's work in one, he must still "keep moving" for the other seven.

Such are his garrison duties; no matter how anxious he may be for improvement, he has reached the limit. A useless and frivolous drill, in which he is seldom the equal, and never the superior of the average militiaman, is presented to him as the most important branch of military knowledge. Unless his company be ordered into the field he may serve his entire enlistment without even learning how to pitch a tent.¹⁷ He learns his duties only by word of mouth. In England we find one firm alone publishing thirty-four volumes for the use of enlisted men in learning their military duties.¹⁸ In the whole United States—not one.¹⁹

I have read of a system of punishment (said to be unduly severe) employed in some penitentiaries by which the convict, though always working, was never allowed to *finish* anything. Some traces of this system are found in our Service. Orders concerning drill, issued by Department commanders, often deprive post and company commanders of the power to excuse any man, no matter how proficient, from the tiresome, monotonous routine of company drill. Thus the soldier, no matter what his length of service, never finishes his primary instruction.

The hardest of physical labor, when accompanied by mental interest, is seldom tiresome, as witness the miles traveled by the hunter in pursuit of game. But even physical inactivity, against which the mind rebels, becomes wearisome, as, for instance, waiting for a railroad train. *The soldier is always waiting.*²⁰

That it is not the amount of labor required in our army, but the lack of interest taken in that labor, which makes it unbearable, can be clearly shown. The men who do the most work are not the men who desert; men on extra and daily duty, whether

mechanics or laborers, rarely desert; cooks always growl, but still remain; farriers and saddlers seldom desert; while the men who do the most work for their small pay—the cavalry blacksmiths—generally end their service by honorable discharge.

It may be urged that the daily toil of the laborer in civil life is just as monotonous. Such is seldom the case; but, even if it be, this monotony for the laborer ends at sunset. His evenings are his own. But the soldier, after his day's duty is done, is forbidden to seek recreation; he must not stray without the limits of the post; or, if he do, must hasten back to answer his name at tattoo. The time of tattoo is generally 9 P. M. This is later than any entertainment begins, and earlier than any closes; the effect is, therefore, to prevent the soldier from enjoying his evenings.

Tattoo does not exist in the field, and, therefore, must be considered only as a feature of garrison life. Its antiquity cannot prove it of value, for what was necessary in one age may be worthless in another. Considered, then, as a feature of garrison life in the present day, is it of any value and, if so, of what? I have asked this question of many officers and have never yet received a satisfactory answer. Some reply that it "keeps men in the post;" but this answer is of no value unless it be also shown that some gain results from thus keeping men in the post.

I firmly believe, if the opinions of all company commanders could be obtained, that ninety per cent. of the number would favor abolition of tattoo. Those who favored its retention would probably assign as their reason "that it acts as a restraint upon the soldier," as though the soldier were a creature to be forever and invariably restrained.

But government interests demand that the soldier secure a necessary amount of sleep. We must, therefore, require him to be in bed at a certain hour. Tattoo is a means to this end.²¹ But this end can be better accomplished by having the non-commissioned officer in charge of barracks make a "check roll-call" at 10.30 or 11 P. M.²² This system would insure men being in barracks at the hour designated, and *staying there*. A man who returns to barracks at 10.30 P. M. rarely leaves again that night. But, under the present system, many men defer their departure from the post until after tattoo, and thus reach the neighboring town at an hour when respectable places of amusement are closed, and only houses of low resort are open.

But some contend that tattoo is no hardship, "because the soldier can always get a pass." Two replies may be made to this: First, the soldier can *not* always get a pass; second, application for a pass must be made before 8 A. M.; and the average man, in the Army or out, does not know in the morning how he will pass the evening.

An objection to the abolition of tattoo may be "that it would leave the post without men;" but there is no more danger of this than there is of the simultaneous withdrawal of all deposits from a bank.²³ And should one-half of the garrison be absent from after retreat until 10.30, what harm would result? There can be no sudden demand for their presence unless in case of fire; and who ever knew of a *lack* of men at a fire in a military post?

But suppose that the soldier be on pass, and, after retreat, wend his way to the town near his post, has he then the same opportunities for social enjoyment as the day laborer? Most decidedly not. *He is a social outcast, and because of the uniform he wears.*

The uniform of his country is, theoretically, a thing to be proud of, but, practically, a badge of disgrace. One must wear the uniform of an enlisted man to feel the truth of this, *and I have felt it.* The laborer, his day's work over, may dress himself in his best, and become, on the street or at the theatre, the equal of his employer. How is it with the soldier? *Let a girl, no matter how well dressed, walk down the principal street of any garrison town by the side of an enlisted man in uniform, and nine-tenths of the observers will assume that she is a servant girl, while the assumptions of the remaining tenth will not be so charitable.*²⁴

Let us inquire into the causes which produce this result. As the strength of a chain is measured by its weakest link, so is the reputation of men in uniform determined by the behavior of the worst class who wear that uniform. One soldier in uniform, drunk in the street, brings disgrace upon all his comrades. The vices of the soldier are noted, while his virtues are ignored; for we only count the *broken panes* in a window.

The general impression among civilians is that the Army is composed of the offscourings of society. Nor should we wonder at this opinion; the fault lies at our own door. Those officers who make reports concerning the character of the enlisted man generally know the least about him. This constant cry of "the necessity of elevating the standard of our enlisted strength,"

though made by those who have but slight knowledge of the present standard, naturally has an effect upon the reading public. The company officers who, by close and constant association with the enlisted man, learn his character, do not make annual reports.

"But 'fools rush in where angels fear to tread,' and we find that a chaplain, who evidently knows as much of the character of the enlisted man as he does of the personal appearance of Moses, has, by means of a monthly periodical,²⁵ edited by himself, done more in eight months to injure the character of the enlisted man than he can ever undo, though he should devote the remainder of his life to reparation. It matters not that *we* know him to be profoundly ignorant of the subject which he treats. The civilian reader does not know this. He only knows that this writer is an army chaplain, and, therefore, reasons thus: 'A chaplain of all officers must have a knowledge of the soldier's inner nature. He is the spiritual adviser and also the confidant of the enlisted man. He must know the true character and moral 'needs of the soldier.' When, therefore, this chaplain dwells at length upon the prevalence of intemperance in the Army, and finally states that, in ability to purchase intoxicating liquor the soldier should, by legislation, be classed with the Indian;²⁶ the civilian must believe the average enlisted man a drunkard, whose indulgence in intoxicating liquor is limited only by the amount of his pay.

What constitutes moderate, and what immoderate, drinking cannot be mathematically defined; neither can the adjective "tall." But if we say that John Doe is a tall man, we mean that his stature is greater than that of the average man. So, if we say that soldiers, as a rule, drink immoderately, we must mean that they drink more than the same number of men in other walks of life. By comparison, then, we can ascertain the truth or falsity of this statement; and while for obvious reasons an exact comparison is impossible, still we can make one exact enough for our purpose.

In the United States the average family group consists of five persons.²⁷ Consequently, in a town of five hundred inhabitants, there are about one hundred adult males. As intemperance is almost universally confined to adult males, the "drinking-power" (if I may coin a term) of one hundred soldiers may be fairly compared to that of a town of five hundred inhabitants. This stand-

ard established, let us compare soldier and civilian. The position of post-trader at a two-company post (strength about one hundred) is not, by any means, considered a prize, although exclusive privilege of trade (not only in liquors, but also in dry goods, groceries, etc.) is guaranteed. Yet we often see towns of five hundred inhabitants with two, and sometime more, saloons. In Fort Leavenworth, located in a prohibition State, with a large "outside" (*i. e.*, civilian) trade, the bar-receipts of the post-trader do not average one and one-half dollars per month for each enlisted man of the garrison.²⁸ Yet he has the exclusive privilege of trading in a post of seven hundred²⁹ enlisted men; which (the saloon portion) must be compared with the exclusive privilege of selling liquor in a town of thirty-five hundred inhabitants. But Abilene, Kansas, "one of the most thriving, intelligent, and moral communities in the State," with a population of four thousand had, in 1884, six saloons, and one wholesale liquor house.³⁰ And Elgin, Ill., with a population of about 15,000, (a strong temperance element, and a license fee of \$500), had in 1887, twenty-six saloons, or one to every 577 inhabitants.³¹

But it may be argued that, by the showing of Dept. Judge Advocates, drunkenness is the cause of half the court-martial trials in the Army. We must remember, however, that what is sometimes called "forgetfulness," "indisposition," or "a slight headache," in civil life, is classed as drunkenness in the Army; also that the enlisted man is under almost constant supervision, and that the slightest dereliction or omission, in which intoxicating liquor plays even the smallest part, is classed as "caused by drunkenness" in those yearly reports, which few read, and none understand.

I have briefly sketched the life of the private soldier: a monotonous present, with but slight hope for the future: restrained at home and slandered abroad. Some may say that the Private has always hope of promotion. But what means has the Captain of determining the relative merits of his private soldier? *He has three, two positive, one negative, and all imperfect.* The first is the statement of the First Sergeant, the most valuable, but still, second-hand. The second is the number of times a man has "taken orderly," a method manifestly unjust, as it is not *cleanliness* of accoutrements, but their *brilliancy*, that is compared by the Adjutant at guard-mounting. Thus, the soldier who has the patience, or rather the stolidity, to rub a piece of leather for six

hours per day, is selected orderly and accounted—a good soldier.³² The third method is the absence of reports for military offenses. According to these methods, the man who plods through his routine of duty, rubs his accoutrements diligently, and is careful neither to miss a roll-call nor to offend the First Sergeant, is in a fair way for promotion. While a man, no matter how competent, who neglects these important particulars, is apt to serve as a private until he is discharged—or deserts. So much for the hope of promotion.

Therefore, in reply to the question, "What causes desertion in our army?" I answer: 1st. The monotony of the soldier's life;³³ 2d. Its unnecessary restraints; 3d. The low social position of the enlisted man.³⁴

If we can remedy these evils we will largely prevent desertion. Legislation is not needed. The regulation-making power can of itself apply the remedy, which is to make the soldier's life more pleasant. This can be done without either increasing the cost to the Government, or impairing his efficiency as a soldier. Increased pay would violate the first of these conditions, and a shorter term of service the second.

But make the instruction of the soldier (*i. e.*, his daily duty) something that will exercise both his body and his mind. Instead of practicing him, day after day, in the arts of the militiaman, teach him something that will make him a better fighting-machine; give more weight to his knowledge of out-post duty than to the position of his little finger in the second motion of reverse arms; and you will not only make him a more valuable soldier, but a more contented one.

Require from him the most rigid observance of every duty; but, when that duty is over, do not hamper him with needless restraints. *Restraints that are unnecessary are tyrannical*, and tattoo is of this class.

And when the soldier has finished his day's duty, when he leaves the post to seek recreation in town, *let him wear any respectable garb he pleases*. If he conduct himself properly, it matters not what dress he wear; but if he behaves improperly, it is better that he be in civilian dress, as he cannot disgrace the uniform if he does not wear it.³⁵

But if he choose to wear his uniform, and disgrace it, either by being drunk, or by being seen in disreputable places, then let his

punishment be of the severest ; and not only will the soldier be taught to respect his uniform, but civilians will do the same.

These suggestions will, no doubt, be called impracticable by a certain class of officers. Magazine-rifles have been condemned by this class because of the difficulty in executing with them that important movement known as "support arms." When the leather stock was abandoned, they prophesied that its loss would prove fatal to military discipline ; and, to them, my suggestions probably appear equally dangerous.

FT. LEAVENWORTH, KAN., May 14th, 1889.

NOTES.

1. The reports of the Adjutant-General, for the respective years give the following data :

	1884.	1885.	1886.	1887.	1888.
Enlisted.....	8770	6759	4970	5837	6310
Deserted.	3672	2927	2090	2240	2436

(Re-enlistments are not included in these figures).

2. 13,365.

3. Since writing this, evidence that deserters at large have influence, has been presented in the shape of a letter in their behalf from Senator Plumb, of Kansas, to the President.

4. Enlisted strength present, June 30, 1887 (exclusive of non-commissioned staff not belonging to regiments) 531. Desertions during fiscal year ending June 30, 1888,

34. "No probable cause assigned" in 24 cases.

The enlisted strength of the "line of the army" was, June 30, 1887, 20,238. Desertions from same, during fiscal year ending June 30, 1888, 1872 or 9 $\frac{1}{2}$ per cent. This showing is largely in favor of Fort Leavenworth. But if "poor food" and "excessive fatigue" are the principal causes for desertion, those 24 men (see above) would not have deserted, for the food at this post is excellent, and the fatigue almost "nil."

5. Report of Inspector-General for 1885.

6. The records of the Judge-Advocate's office, Department of the Missouri, show the following : Of the first one hundred deserters (in dept.) in 1888, where education was classified by the "B. of S." 15 are reported as "poor" or "ordinary," 67 as "fair" or "average," 14 as "good," and 4 as "very good" or "excellent." What a board of officers would call a "fair" education might be called "good" by others.

7. In Minnesota and Iowa the average monthly wages paid to farm laborers hired by the year, was in 1888, \$17.41 with board. The average for the whole United States during the same year was much lower, being \$12.36 with board. The average monthly pay of laborers in manufacturing establishments was, in 1886, \$35.00 without board. (Edward Atkinson in *Forum* of September, 1888).

Deduct from the monthly wages of the better paid farm laborer the cost of his clothing, the cost of medicine and medical attendance when sick, and the value of time lost by sickness. In the case of the town laborer the same course must be pursued, deducting also \$15.00 for board, and remembering that though his income ceases during sickness, his expenses are constant. The remainder, in either case will hardly equal \$13.00.

8. The reading-room of Fort Leavenworth receives 16 weekly and 9 daily papers. In the library are 2988 bound volumes. Smaller posts are, of course, not so well supplied; but it is safe to say that few posts have less than half this number, either of books or papers.

9. Not individuals selected, but the whole number engaged in any one trade, art or profession. Lieutenant Wagner, 6th Infantry, who visited Europe in 1888, and while there had excellent opportunities of informing himself upon the subject, says, "The enlisted men of the much-vaunted German Army can in no way compare, man for man, with the United States soldiers." If this opinion, coming from an American officer, be thought prejudiced, I invite attention to the statements of Prince Hohenlohe concerning the German soldier (page 104, JOURNAL OF THE MILITARY SERVICE INSTITUTION, March, 1889).

10. Gen. Ord. No. 130, A. G. O., 1882.

11. In annual reports for 1883, Department of Arizona, shows 204 desertions—no cause known in 103 cases, and "dissatisfaction" assigned as probable cause in 28 cases. Department of the East shows 180 desertions—findings of boards not given, but "discontent" said to be the principal cause. Department of Platte shows 210 desertions—no cause known in 148 cases, and "dissatisfaction" assigned as cause in 26 cases. Department of Texas shows 325 desertions—no cause known in 238 cases, and "dissatisfaction" assigned in 49 cases. Department of the South shows 67 desertions, "in more than half of which no cause could be found."

In 1885 Department of the Platte reports 298 desertions—no cause known in 232 cases, and "dissatisfaction" assigned in 13 cases.

12. And often convince themselves that it *was* the cause.

13. General Stanley's remarks on this subject (in Report for 1885) are of interest and will repay perusal.

14. The recruit's manner, his conversation, and especially his questions, show this intention. He inquires as to how much of the "clothing money" can be saved, how much money a man can manage to "put away with the paymaster," when the different "non-coms" are to be discharged, and whether they are apt to reenlist or not, etc.

15. This is a familiar sight, any old soldier can tell of twenty cases.

16. I believe that no man ever served an enlistment without, at some time, feeling a temptation to desert. If his sense of the moral obligation of his oath be stronger than the sense of personal inconvenience, he overcomes the temptation and remains; if not, he yields to it and deserts.

17. We see recruits constantly drilling the manual and marching, but we seldom see a squad instructed in the art of putting up a tent, nor are there any recognized instructions for doing it.

18. Gale & Polden, Chatham.

19. There is, I believe, a manual of guard duty published somewhere in the United States, but that is more for the guidance of the militiaman than for the instruction of the enlisted men of the Army.

20. For his discharge, or something to break the monotony. Every order for a change of station is hailed with delight by the average soldier. No matter where it be to, he is always "glad of a move."

21. We must regard it as such, unless it be an empty form, as men are not inspected at this formation, and do nothing but answer to their names. In fact, the darkness prevents recognition of individuals, and one man may easily answer for another. I knew a soldier to perform this slight duty for four of his comrades at one tattoo.

22. By this I, of course, do not mean a formation, but merely a "checking off" of the present and absent.

23. A battalion of my regiment marched through Kansas in the summer of 1885. We almost invariably camped near towns, and, though we had neither "check" nor tattoo, there were rarely 20 per cent., and never 30 per cent., of the men absent.

24. A non-commissioned officer, who has a grown daughter, told me that, on this account, he would not accompany her to town while in uniform.

25. I am, perhaps, giving too much prominence to an insignificant sheet (now defunct), but its power for evil was increased by the fact that it was distributed gratuitously throughout the country.

26. "No civilian not under military authority should be permitted to furnish a soldier with anything that intoxicates. Such legislation, with suitable penalties, would save the Army a vast deal of trouble in disciplining its soldiers." Quotation from the sheet referred to in the preceding note.

27. Shown by last census. The figures (relative) have probably not altered since. This basis is used for computation by Edward Atkinson (*Forum*, December, 1888), and by Senator John T. Morgan (*Forum*, February, 1889).

28. From showing of his accounts.

29. Including the prison guard.

30. S. R. Strother, in *Century* of March, 1884, p. 794.

31. Message of Mayor Lowell, of Elgin, to City Council. (Page 20 of "The Political Prohibitionist," for 1888, Funk & Wagnalls, N. Y. City. In order to make a fair comparison, I have purposely selected small towns instead of cities like Chicago, which in 1887 had one saloon to every 190 inhabitants, or cultured Boston, which in 1886 had a saloon for each 128 inhabitants. (Number of saloons taken from page 19 of Political Prohibitionist, mentioned above, and population from "Conklin's Manual," '87 and '88).

32. I have known an "orderly character" to devote all his spare time (about six hours per day) for three weeks "to getting up a kit," in other words, to rubbing leather and brass.

33. The following table may illustrate this point. It shows the number of desertions, per thousand of actual strength, in each arm of the line for the last five years. The actual strength as reported on the last day of the previous fiscal year has been taken, as the nearest approach to strength at beginning of year.

FROM ANNUAL REPORTS OF ADJUTANT-GENERAL.

[Desertions from Recruiting-Depots not included.]

Year.	1884.	1885.	1886.	1887.	1888.
Cav'y,.....	160	104	71	68	88
Inf'y,.....	151	111	74	92	93
Art'y,.....	168	121	87	111	130

There is more duty required of the enlisted man in cavalry than in either of the other arms. Still the percentage of desertion is least in cavalry. But the cavalry's duty, being more varied, relieves, in some degree, the monotony of which I speak. Infantry soldiers, whose life is more monotonous, desert in larger numbers; while in the artillery, whose life is always in garrison, the greatest number of desertions occur. This monotony is not felt so much by colored troops, as we find the desertions from colored cavalry greatly in excess of those from colored infantry, more than two to one per thousand.

34. Those who do not lose in social position, *i. e.*, the colored troops, do not desert to the extent found in white regiments. Thus we find that the eight white cavalry

regiments have lost by desertion 3203 men in the last five years, an average of 400 each, while the two regiments of colored cavalry have, in the same time, lost but 238 men, or an average of 119 each.

In the infantry the contrast is still greater : The twenty-three regiments of white infantry have lost by desertion in the last five years, 5585, men, or an average of 243 men each, while the 24th infantry (colored) has lost but 14 men, and the 25th infantry (colored) but 53 men, in the same time. Even these figures hardly show the difference, because, when a colored soldier deserts there is generally some immediate and well known cause for his act.

35. Last February, I saw an enlisted man, in civilian dress, leaving a Rapid Transit train. The train was moving slowly, and the man was very drunk. As he stepped off the train, he fell flat on the ground, and rolled very nearly under the wheels ; but, fortunately escaping unhurt, he rose and staggered away. Fully twenty civilians saw this, but I doubt if any of them knew the man was a soldier. Had this man been in uniform what would have been the effect on the minds of those twenty people ?

SOME THOUGHTS WITH REFERENCE TO THE ORGANIZATION OF OUR ARTILLERY.*

By FIRST LIEUT. E. M. WEAVER, U. S. A.

SECOND ARTILLERY.

INTRODUCTORY.

THERE is, perhaps, no one professional subject so near to the hearts of artillerymen in this country, at the present time as that of organization.

Artillery has, during the last score of years especially, evolved into a number of distinctly differentiated divisions, so varied as to use and nature that the problem of organization, as a whole, is something totally different from what it was in the time of our predecessors.

The evils of our present condition, and the shortcomings due to it, have of late been freely proclaimed by kindly disposed writers. In some measure as a reply to these representations, the five artillery regiments, acting as a body, assembled a number of officers to consider matters pertaining to the welfare of the arm. These officers constituted what is known as the Artillery Council. They met in the fall of 1887, and, through a duly submitted report, gave expression to the sentiment that the artillery arm is fully aware of its neglected condition, alive to its needs, able to suggest efficient remedies for the known defects, and to point out a proper pathway ahead.

On examination it will be noted that the report of the Artillery Council refers almost exclusively to administrative features. It provides for a head to the body artillery, seeks to establish earnest professional work throughout, endeavors to improve the quality of the enlisted *personnel*, tries to solve the vexatious promotion problem, and suggests a scheme for developing a volunteer artillery reserve among our citizen-soldiery.

The report does not, however, touch upon the matter of the

* This essay was awarded the Special Prize recently offered by the Military Service Institution for the best short paper upon an Artillery topic.

relations subsisting among the several divisions into which artillery is now subdivided, nor does it lay down the lines establishing these subdivisions or set forth the principles determining the same.

It was, undoubtedly, a wise thing to limit the report to the lines adopted. The points put forth therein were and are the most crying needs of our condition; they bear with equal weight at all times under any system of organization. It will be a forward step if the report is ever so far resurrected from its entombed status as to have many or some of its recommendations vivified by the breath of orders or law.

Recognizing, therefore, the prior claim to attention of these burning administrative questions, it is the aim of the following paper to enter the other field referred to above, namely, the consideration of the principles affecting the subdivision of artillery into branches, and the bearing these have on organization.

A GENERAL ANALYSIS.

In its ultimate and general sense the object of organization is the performance of some work which either cannot be performed singly by individuals, or can be better performed by the aggregated action of a number of individuals. This applies to any and all combinations of men for the performance of specific work. Hence, if there be a specific work that cannot be performed by one man and can be performed by a number of men, or can be performed better by a number of men than by one man, the number employed must be *organized* to work together for the accomplishment of the work in hand. Hence, further, we arrive at the principle, that the nature of the work determines the number of men required to best accomplish it, the qualifications they should possess, and the conditions under which they should be united and worked together for the common end.

Again, if there be two or more distinct kinds of work to be done, it follows that there should be a distinctive organization for each case, adapted, respectively, to the distinctive differences.

Applying this to artillery organization, it is necessary to consider:

- I. The nature of the distinct divisions of artillery work, and,
- II. The nature of the organization suited to each.

I. NATURE OF ARTILLERY WORK.

The most general dividing line that may be drawn in classifying artillery is that which separates the *mobile* artillery from *fixed*

artillery. The former includes that which is mounted on wagon-road carriages and is susceptible of being moved with the army in the field, and works actively as a supporting force to infantry and cavalry; the latter embraces all guns permanently mounted in seacoast forts or interior fortresses; it has no active part to play in connection with the army in the field.

MOBILE ARTILLERY.—All military authorities classify mobile artillery into the following sub-divisions:

1. Mountain artillery,
2. Horse artillery,
3. Field artillery (*light and heavy*).

It will be necessary to consider still another sub-division, namely, 4. Machine-guns, for it seems to be definitely determined that the artillery shall assume the charge of these new war-weapons.

1. *Mountain Artillery.* An army is often forced to manœuvre in a mountainous country. The need of artillery is thereby by no means rendered less urgent. If anything, the value of artillery is enhanced by the conditions. There will at every turn be abundance of natural cover for an enemy in such a theatre, from which, perhaps, nothing but a powerful shell-fire will displace him; in addition, artificial protection will be found at every narrow gorge and steep ascent, and this, also, demands a strong shell-power to brush it aside. Indeed, a way through such a country may often only be opened to the infantry by its artillery support. It is precisely here, however, that the ordinary field artillery will not be able to perform its functions, for, as a rule, the topography is such as to make it an impossibility to reach positions from which its fire may be delivered. Special guns have therefore been devised for this service; the guns are made very light for the caliber ($2\frac{1}{4}$ to 3 inches), and fire a shell weighing 9 to 12 pounds with low initial velocity. They are mounted on special carriages, and, when necessary, all parts of the battery may be transferred to and transported on the backs of animals. No better illustration of the value of artillery in mountain warfare and of the immense importance of a type of gun like the above, in saving labor and time, is to be found in history than that given by General Gourko's campaign in the Balkans, near Sofia, in 1877.¹

2. *Horse Artillery.* One of the most important changes ever effected in the Art of War, especially in so far as it made cavalry

more independent and more widely useful, was the introduction of horse-artillery by Frederick the Great ; its efficiency established it at once forever as the complementary arm of cavalry. Its use in modern wars has rather increased in importance than diminished, for cavalry is now called upon to separate itself by wide distances from the army proper in the performance of some of its most important work, and particularly in connection with the modern use of cavalry in fighting as infantry, on foot.² It is also an essential constituent of the advanced guard the advanced cavalry force, and all detached bodies of cavalry of any size. It serves, on meeting the enemy, to assist in securing important points in the front of the army, for use in the battle that is to follow. The use of the horse-batteries of the advanced cavalry force by the Germans between Tronville and the Verdun road, August 16, 1870, is typical of this use of horse-artillery.³

3. *Field Artillery.* Since the days of the catapult some huge missile machine has been in service on the battle-field to aid the efforts of the regular foot soldiers. Field artillery was not, though, of any great service until the time of Gustavus Adolphus.⁴ Since then, however, it has steadily developed in importance, and to-day is of greater weight in the scale of war than ever before.⁴ It is impossible here, by reason of the narrow limits placed on the essay, to refer, even, to all of its present functions as a supporting arm on the battle-field.⁶ The principle of massing fire introduced by Napoleon I. at Friedland, and used with such effect at Wagram, Lutzen, and Hanau, has been more recently confirmed at Woerth, Mars la Tour, Gravelotte and Sedan. This, with the bold pushing to the front of artillery at the very beginning of the battle and pertinaciously holding to positions, are the most recent principles established in this sphere of artillery work.⁷

The use of heavy and light pieces introduced by Gustavus Adolphus, still holds. The attempt of Napoleon III. to substitute for the two an intermediate piece to do the work of both, did not meet with approval. The long range of the powerful heavy "guns of position," their effective shell fire against troops in the buildings of villages, etc. along the line of battle, and shrapnel fire over the heads of attacking troops,⁸ are thought to be of especial importance. On the part of the defense these heavy guns are terribly effective against troops in massive formations.⁹

4. *Machine-Guns.* The exact niche that machine-guns of vari-

ous calibres are to fill in war is not yet clearly defined. Although they have been used in several small expeditionary campaigns by European forces, and against the Indians in our own country, they have not yet had the test of use in a large war to crystallize the undoubted great merits they possess into fixed limits of action and organization. We have gone as far as any nation has by definitely assigning them as a class of weapons to the artillery arm of the Service, and our officers have done as much as the officers of any other army in studying out the legitimate sphere of action within which the guns must be used in regular warfare and in establishing principles of organization.

The opportunities for the use of these guns on the battle-field will be of immense importance, but of the most fleeting character, and must be snatched on the instant, or lost forever; a suddenly developed charge to be checked, a mass of artillery coming into action to be broken up, a temporarily exposed mass of troops to be demoralized, such work as this will be particularly within the limits of their effective action. On the defense they will be of special service in guarding long lines of defense in front of entrenched positions, protecting roads, defiles or bridges, covering the crossing of streams, and the embarkation and debarkation of troops, and also covering retreats. It is likely, also, that machine-gun artillery will become a standard advanced-guard force. It is well adapted to render important support to cavalry and artillery when exposed to sudden flank or other attack.

It is clear that the service should be characterized by the greatest possible mobility. The batteries ought, therefore, to be equipped as horse-batteries, using horses built especially for speed, the insignificant weight of pieces and absence of recoil making it possible to use very light carriages and rendering draught qualities in horses of secondary importance. Such a service evidently calls for high intelligence, great courage and boldest dash in its personnel.¹⁰

SIEGE ARTILLERY.—Siege artillery occupies a place of its own. It is, as it were, an intermediate division between field artillery and fort artillery. It has the mobility of the former, but *rate of movement* does not enter as an important factor. The object of its service is totally different from that of field artillery, and more nearly approaches that of fort artillery; also, it has no *direct* connection with the *movements* of the field army. Generally it comes into operation only when the army is obliged to

halt for some time, by reason of overwhelming material obstacles,¹¹ or it finds itself left with a detached force and charged with demolishing formidable protection covering a threatening body of the enemy which has been passed by the main army.¹² Its chief function is, therefore, the destruction of material obstacles, principally in the form of parts of permanent fortresses, or the parapets of carefully constructed earthworks. It must stand opposed to the heaviest fortress ordnance. It must beat down scarps and ramparts and parapets, opening breeches for assaulting columns. Mobility is evidently here at a minimum, gun-power at a maximum, weight of gun being only limited by the means of transportation; the larger the gun that can be mounted in the parallels the larger the shell-crater, the sooner the breach. Besides this work of direct fire, there is the further important siege-work of mining, and the destruction of bomb-proofs and rendering the terre plein untenable by means of curved fire of siege mortars and howitzers. Recent wars indicate increased use of siege artillery.¹³

FIXED ARTILLERY.—The service of the guns to be mounted in our sea-coast and lake-shore forts constitutes the work under this head. There is in foreign services, a fortress artillery for garrisoning and defending interior fortresses. Our system of permanent fortifications does not involve such interior works. If the necessity for a strong internal defense should at any time develop during war, it would be met by such a system as that applied about Washington, D. C., during the Rebellion, and, in some measure, more recently illustrated in the defense of Plevna by the Turks.

The task of defending our coasts is, without doubt, the most important work the artillery of this country has to deal with. In Europe the mobile artillery is, except for England perhaps, that of preponderating importance, but, in the United States, by reason of its isolation and strictly defensive peaceful policy, the artillery that will be mounted along our coasts is of vastly greater importance. It is well to note that in case of war with a strong maritime power, this artillery will be the first needed. Moreover, of all the fields of artillery work this is, admittedly, the one that has been more affected by scientific developments in gun-making, armor-making and high-explosives, than any of the other remaining divisions. To such an extent has sea-coast artillery been affected by these developments, that it may be

truly said that its present work is a thing entirely new. There is no historical example that may be referred to in illustration of the features of the coming combat between the modern fort and modern war-ships.¹⁴ Probably the nearest approximation to modern conditions in the past is to be found in the defense of Charleston Harbor by the Confederates against the Federal fleet during the Rebellion.¹⁵

An important part of the work of sea-coast defense is that connected with submarine mines and the development of the new weapon just presented to us as a torpedo thrower—the pneumatic-gun. But the primary work will be, to harmoniously adjust the powers of *all* weapons, to become familiar with the large sea-coast guns and the mechanical devices for loading them, and the labor-saving machine-carriages on which they will be mounted, to determine the value and limits of use of mortar salvo-fire, and the complementary fire of the smaller caliber rapid-firing guns. It requires an accurate minute knowledge of the channels of our water-ways, and the features of construction of foreign men-of-war and the nature of their armament. Associated with it is range-finding, ship-tracking, and combined battery-fire by aid of electricity, such as has never before been dreamed of in war.¹⁶

It is evident that work like this demands a highly scientific *personnel*. It calls for a life-time of study and practice if an officer aims to be an efficient artilleryman in this field. The enlisted *personnel* also must be highly intelligent and induced to remain in the service for long periods.

From the standpoint of our present status we are farther removed from efficiency in this division than in any other; in truth we have yet the first step to take.*

II. ORGANIZATION.

Having given a skeleton sketch of the distinctive work of the different branches of artillery, it is necessary, next, to examine the bearing it has upon the question of organization.

Looking at the whole range of artillery work mapped out above,

* Attention is specially called to the unmistakable effort of the Navy to enter this field. If we do not occupy it at once we will clearly be deprived of the opportunity of doing so. See, for instance, Chap. I. "General Information Series No. VII." Naval Intelligence Bureau's Publication for 1888. Note also the Naval Artillery Reserve Bill recently passed by the N. Y. Legislature and the comments of Governor Hill in signing it.

it is believed that many will frankly admit that *all* is more than any officer can master. If it be admitted possible, however, for the sake of argument, a new difficulty appears in the ordinary diversity of physical qualifications and individual preferences, likings or inclinations. It is beyond what is possible to grant in discussion that the same officer will be well suited to and ardently inclined toward the slow, methodical, deeply scientific work of sea-coast artillery, and in the same manner and to the same degree disposed toward the active, dashing work of horse or machine-gun artillery. To get the best results from men they must be adapted to their work as well by natural *affection* as by mental and physical qualifications; it is only when this rule is observed that men put their souls into their work. It may, then, be taken for granted that a field-artilleryman—so constituted by nature—would not be happy or efficient as a sea-coast artilleryman, and *vice versa*. It is proper, therefore, to recognize the desirability, if not necessity, of discrimination in the appointment of the *personnel* of essentially different branches of artillery.

It must be admitted that only a poor quality of work can be hoped for if each artillery officer is expected to expand into the full spheres of six different professional divisions, any one of which is at least equal in limits to the sphere of the cavalry or infantry officer, and the functions of which, if faithfully studied and practised, will demand all his energies.

If this analysis be correct, what shall be said of our present system? What do the officers and men of our artillery know of modern artillery work? How many have looked upon a mountain or horse-battery, or a modern sea-coast gun? If any have been fortunate enough to have progressed so far as artillerymen, it can not have been in the United States, for these divisions have not been represented in our Service since the War at least. It is not wrong to say—because it is true—that it is deceiving the Nation to call by the name "artillery" any part of the five regiments of soldiers so designated in the Army Register, except the two light batteries of each regiment and the Fort Monroe garrison. Nor is it an overstatement to say that there is not in our Army a *thoroughly* efficient artilleryman in *practical* and theoretical work in any one of the several divisions of work sketched above, judged by present standards.¹⁷ It is unnecessary to pursue here the responsibility for this lamentable state further than to say

that the *artillery* is in no way accountable for it, except in so far as it has not raised its voice at every opportunity to proclaim the neglect with which it has been treated.

With emotions of professional gratitude, it may be truly said that the skies overhead appear brighter for the artillery now than they have, perhaps, ever before. Every artilleryman must be stirred with delight and encouraged to really hope for better things by the signs of evident interest manifested at the War Department, within the past year, in matters pertaining to artillery.

It must not be supposed that the artillery problem is to be solved by a change to a corps organization, or to any other system that does not recognize the controlling principle of proper work-subdivisions and assignment of *personnel* in harmony with these subdivisions. If we are all of us to be kept passing from one class of work to another, it makes little difference whether we retain our present regimental system or pass to a corps system. In this connection attention may be called to the fact that the English are suffering from essentially the same artillery troubles as ourselves,¹⁸ and yet The Royal Regiment of Artillery is a corps, pure and simple. It is a coincidence worthy of note that almost at the same time the Artillery Council met in this country a Royal Commission was assembled in England to consider matters of artillery organization. In both countries the state of artillery training is unsatisfactory¹⁹—admittedly so—and there is an earnest desire to make it what it ought to be.

It is assumed, therefore, that our Peace system ought to provide for thorough training in each branch of artillery work, and that our organization be so framed as to serve this end. It is exactly because officers have not had the means and opportunities of serving with batteries properly equipped under each branch, that, if hostilities were now to come suddenly upon us, there would not be a single officer instructed in the command of horse, mountain, or sea-coast artillery of modern type; and yet these are the very kinds of artillery that are needed in the first instants of war. The outbreak of war ought to find us able to spring to any gun in the list and serve it with familiarity according to the latest practice.

Furthermore, and a most important point, if our organization set apart by name a body of men, in a permanent way, for the service of each class of gun, we might be more apt to get the guns.

The question presented is, How may the principles here suggested be applied to our present status?

The one grand fact that is to be noted as standing out in bold relief is, that some artillery is regularly assigned to divisions and army corps as a part of their normal composition, and its use in war depends on the action of other arms, while, on the other hand, sea-coast and siege artillery is not assigned as a component part of the field army's strength, and if used in connection with other troops, these latter are present to defend it from capture or interference while in action.

This fact has an important bearing on organization in this: it is evident that the first named class must so adjust the sizes and nature of its regular subdivisions as to yield *proper fighting units*, adapted to the needs of its service as a supporting force. As a consequence, based on long experience, it is the custom, the world over, to divide this artillery into brigades, regiments, batteries, platoons, and sections, or equivalent divisions. On the contrary, no such necessity, or reason of convenience, holds in the case of sea-coast artillery. The fighting of a sea-coast fort is a thing complete in itself; it no more requires a "battery" or a "regimental" organization than does the fighting of a man-of-war. The adjustment and use of the fire of a fort are natural units that are to be specially determined by careful preliminary scientific study for each locality to be defended. The result of this study in each case will determine the nature and size of the garrison, and the commanding officer ought to be free to so assign the men and officers to the performance of the various functions connected with the defense, that the fort, as a whole, may be fought to best advantage. From the very nature of the case, therefore, it is impossible to ascribe any number of men as a *garrison unit*, or to impose *fixed* lines of division within the garrison itself. The utmost elasticity should be held out to the fort commander in his effort to adjust the fighting units of his command so as to best serve the special armament of the fort.

Omitting the consideration of siege artillery for the present, and remembering we are not interested in fortress artillery, we have two distinct divisions of artillery, *viz*: 1. *Sea-coast artillery*, 2. *Artillery of the field army*, each totally diverse from the other in nature of work, weapons, and qualifications of *personnel*. It is submitted that our system of organization should recognize this

radical diversity and *separate the two, permanently, into two distinct bodies.*

For the sake of illustration, the following suggestion is ventured as one way of passing from our present basis to that proposed.

If three batteries were mounted in each of the five regiments of artillery there would be fifteen mounted batteries, which might be equipped as follows:

- Three batteries of *horse* artillery.
- Six batteries of *light field* artillery.
- Three batteries of *heavy field* artillery.
- Two batteries of *machine-guns*.
- One battery of *mountain* * artillery.

organized into five battalions of three batteries each ;[∞] the whole further organized in time of Peace for administrative purposes and for instruction as a small corps or on a regimental basis as would best serve these ends.

This would constitute our force of mobile artillery ready for immediate service with an army corps in the field at the outbreak of hostilities, and would give the proportion of three guns per thousand men for an army corps of 30,000 men.

The remaining thirty-five batteries of the present regiments could then be consolidated under a separate corps organization, with a view to garrisoning our sea-coast forts.

After separation, appointments promotions and enlistments, and all administrative functions should be distinct for each body.

The plan appears to be entirely in harmony with the present policy of "schools of instruction;" for each division of mobile artillery could be assembled so as to constitute the "school" for its own service, and newly appointed officers could pass from one school to the other in regular order until instructed in all five branches, and then be assigned finally to that branch for which special qualifications had been shown. Fort Monroe would continue to be the school of special instruction for sea-coast artillery, to which newly appointed officers should be sent, and at which, besides the course proper, practical experiments should be undertaken and carried on throughout the whole field allotted to this branch. Here, also, could be placed a complete siege outfit, and the present course in siege artillery could be extended to any desirable limit.

* Provided for by orders since this was written.

The only feature of the plan that partakes at all of novelty is the distinct separation of sea-coast artillery from other artillery, and this is not a novelty elsewhere. All the principal powers of Europe, except England, have a separate corps for the performance of this work.²¹ It is confidently believed that some such separation in organization and practice is essential to a proper degree of efficiency in these days.

The above is respectfully submitted in the name of the good patron saint of artillerymen—*St. Barbara*.

NOTES.

1 See p. 328, "The Russian Campaigns in Turkey, 1877-8," by Capt. F. V. Greene. Also a Précis by Capt. W. L. White, R. A., Proceedings R. A. I. for April, 1889.

2. See p. 230, *et seq.* "Virginia Campaign of 1864-5" by General Humphreys. The "Scribner" series.

3. See Ordinance Notes No. 330, p. 8, *et seq.* "Battle of Mars la Tour," by Lieutenant Bigelow.

4. Lieut. E. H. Huyter, R. A., article on "Artillery," Encyclopedia Britannica.

5. Lieut. W. E. Birkhimer, paper on "Relative Importance of Field Artillery," Vol. VI., No. 23, M. S. I. JOURNAL.

6. As to the limits and importance of the sphere of field artillery, see General Hunt's remarks, p. 231, Vol. VI., JOURNAL MIL. SERV. INST.

7. The establishment of these principles is due as much, as to any other cause, perhaps chiefly, to the study of and criticisms of Prince Kraft Zu Hohenlohe Ingelfingen, with special reference to his strictures on the use of artillery in the campaign of 1866. For a concise statement of these, see abridged translation by Major W. L. Haskins, JOURNAL MIL. SERV. INST., Vol. X., No. 37 and No. 38.

8. See pp. 396 and 454, "Russian Campaigns in Turkey," by Capt. Greene.

9. See account of the artillery at Malvern Hill, pp. 162 and 163. Swinton's "Campaigns of the Army of the Potomac," edition of 1882.

10. See Vol. VII., No. 26, JOURNAL MIL. SERV. INST. article on *Machine-Guns*, by Col. E. B. Williston for a full treatment of this subject.

11. Vicksburg, Paris, Plevna.

12. Strassburg, Belfort, Metz.

13. See "Attack and Defense of Modern Fortifications and the Latest Experience and Principles in Modern Sieges," by Capt. J. G. D. Knight, C. E., U. S. A., Vol. VIII., No. 32, JOURNAL MIL. SERV. INST.

14. See "Defense of the Sea-coast of the United States," pp. 27-40, by Gen'l H. L. Abbot, C. E., U. S. A.

15. See official reports of Gen'l Q. A. Gillmore and Admiral Dupont of Operations at Charleston Harbor, 1863; also "Confederate Defense of Morris Island," by Maj. R. C. Gilchrist, Charleston Year Book, 1884.

16. See, for instance, pp. 238, 239, Vol. X., M. S. I. JOURNAL.
17. Those officers who have had *long* service with machine-guns should be excepted here, in so far as this division is concerned, but inasmuch as the machine-guns are the *only modern guns* we have had, it must hold as to "practice" for all other divisions.
18. See evidence of Lord Wolseley before Royal Com. on Art., p. 249, *Edinburgh Review*, January, 1889.
19. In England the defect is principally in coast and fortress artillery.
20. Each battalion would correspond to the German *Abtheilung*.
21. See "Coast Defence Systems," p. 921, *et seq.*, vol. xxxii., No. 146, *Journal R. U. S. I.*

THE UNIFORM OF THE WEST POINT CADET.

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WEST POINT is the home of tradition and military conservatism. That such is the fact is a happy circumstance, for in this age of rampant Philistinism a locality where *festina lente* is the rule of progress cannot but be of advantage not only in preserving the traditions of the past, but in affording an obstacle to an injuriously vacillating policy in military affairs. In no respect is this conservatism more apparent than in the uniform of the Corps of Cadets. While the uniforms of the Army at large have undergone almost innumerable modifications since its organization, that of the cadet of to-day remains practically the same as that of his predecessor of half a century ago. In making any investigations, then, looking to a possible change of any kind in the character of these garments, the inquirer is confronted by a barrier of prejudice so nearly insurmountable as to be almost appalling. But the opinions which the writer has formed are based upon indications of so positive and practical a character that they would seem to demand consideration in spite of custom or tradition.

The examination into the subject upon which the following brief discussion and conclusions are founded, was made by the Medical Examining Board, consisting of Major Charles R. Greenleaf, Captain John O. Skinner, and the writer, in June, 1888, and every facility was afforded them for making an inquiry of the most searching description. The subject was thoughtfully considered in repeated meetings of the Board. Numbers of the officers attached to the Academy were consulted at length, and the opinions of the cadets themselves were heard with close attention. Many measurements were taken and other physical tests applied—indeed advantage was taken of every available means to form an unprejudiced opinion.

The articles found to be particularly worthy of attention were the dress hat and the dress coat.

The Hat.—In order to properly appreciate the merits or demerits of a military dress hat, certain points, essential to the usefulness of the article, should be borne in mind. These may be briefly summarized as follows :

1. It should afford adequate protection to the entire head from the sun or rain in summer and the snow or sleet in winter, from the heat in the warm season and from the cold in the cooler months. It should have sufficient brim to shade, not only the eyes, but also the back of the head.

2. It should be well-ventilated, not coming directly in contact with the head, if possible, but having an air space between the hair and a rim fitting about the head ; an opening should be present at or near the top, to permit the exit of the air entering at the brim, thus providing ventilation by perflation, which seems to be the only practicable means of ventilation for headgear.

3. It should be of sufficiently pliable material to allow it to adapt itself to heads of varying shapes.

4. It must be light and the weight must be evenly distributed about the head.

5. It must be worn with comfort and be in no respect productive of discomfort or illness upon the part of the wearer.

6. For military purposes, it should be so constructed as not to be readily put out of shape, while it should be sufficiently ornate in appearance to satisfy the demand for brilliancy in military attire.

The dress hat of the cadet corps is a *chasseur cap* made of stiff material and provided with an exceptionally heavy leather visor. Those of the cadet privates and non-commissioned officers are furnished with a pompon, set in a metal socket at the front and top of the cap, and projecting forward and upward ; the officers are provided with a plume and socket in the same position, but of greater weight. Upon the front of the cap is a metal cap-plate.

The weight of the privates' hat is about ten ounces ; that of the officers something more—but in neither case is it too great to be borne with comfort, if distributed uniformly about the head. But the ornaments together with the visor cause the greater portion of the weight of the hat to fall upon the forehead just above the eyebrows. The effect of this constant pressure is to markedly compress the skin, nerves and other soft tissues be-

tween two unyielding surfaces—the skull within and the visor without—causing much discomfort, and at times positive suffering. Attention was voluntarily called to this point by members of the graduating class, who stated that, particularly during their first and second years at the Academy, they suffered from headaches which they attributed to the wearing of the dress hat. The weight of the hat bearing most heavily upon the brow would have the same effect as a ligature bound about any portion of the body, compressing the vessels and the nerves, obstructing the flow of blood through the one and inducing a painful reaction in the other. In this way, the headaches referred to may be accounted for in the great majority of instances.

In view of these evident disadvantages, supported by the various complaints, careful inquiries were made into the reasons for continuing the hat as an article of apparel for the cadets. The only reasons that could be discovered, were, (1) its [alleged] beauty and (2) the firm hold upon the affections of the cadets and graduates which long use had given it—neither of which would seem to be sufficient to justify its retention if defective from a sanitary standpoint.

Investigations into the subject were continued with considerable minuteness along this and other lines, and, not to dwell at too great a length upon details, the conclusion was finally reached that the hat was deficient in nearly all the essentials to such an article of head-dress, viz :

1. While it covers that portion of the head contained within its cavity satisfactorily enough, the absence of brim leaves the sides of the head and face and the back of the head entirely without protection from the elements.

2. It is not ventilated, and the confinement within it of the exhalations of the head, particularly in warm weather, makes it oppressive as well as dangerous to health.

3. It is so rigid that it fails to adapt itself properly to heads of different shapes, and thus produces unequal pressure at points in its circumference.

4. While it is light enough to be borne upon the head without annoyance, it is so badly balanced as to throw the greater portion of the weight forward upon the brows, and consequently—

5. It cannot be worn with comfort, and its use is acknowledged to tend to the production of headaches, heat-exhaustion and atrophy of the hair follicles.

The Coat.—The essentials in a military dress coat for the use of growing lads differ in some respects from those of a fully developed adult, but they may be briefly stated as follows, warmth and adequate covering being premised :

1. It should be comfortable to the wearer.
2. It should not bind his body at any point nor cause any distortion of the figure or loss of elasticity or power of any portion of the frame.
3. It should not compress the chest or abdomen, nor interfere with the functions of circulation, respiration or digestion.
4. It should not embarrass the process of development of the youth.

5. It should be so made and ornamented, and of such material as to adapt it for use as a military garment.

The dress coat of the Corps of Cadets is a coatee of antiquated pattern, modeled after the now discarded uniforms of certain foreign regiments of the last century. It is a tight fitting jacket with two flaps hanging from the rear in the manner of the evening dress coat. Its form is such that tightness is essential to neatness. And the requirement of tightness in the coat renders it necessary that the waist-band of the trowsers, underneath it, be still tighter.

Were the coatee made loose so that the trunk could be treated as a cylinder, the garment would be ungainly and present an irresistible tendency to slip up so as to display the undergarments between the trowsers and its lower margin. This can be prevented only by compressing the trunk into the shape of an inverted cone. A satisfactory fit of the garment then demands a tight fit. So tight a garment cannot be comfortable. That this is true in the case of the coatee, is evident from the fact that when studying in their rooms or in *negligé*, the cadets customarily unbutton it. When eating, they give free play to the abdomen by the same maneuver.

In order to test the sensations experienced while wearing the coatee, one of the members of the Board put on the coat of a cadet, the circumference of whose chest was the same as his own. At first, it seemed hardly possible to bring the edges of the coat together, but, after availing himself of the instructions of the owner of the garment, who practised upon him the manœuvres customary among the cadets in getting into the coat, he was able to fasten it about him. Discomfort to the extent of actual pain

was experienced particularly at the level of the ninth rib, which was pressed inward, although the amount of compression was the greatest at the waist. The chest movements were greatly impeded and confined, while thoracic, and in particular, abdominal respiration was markedly limited. And while it seemed possible that the wearer could become so habituated to the pressure of the garment after wearing it for a considerable length of time, as to be able to endure it without suffering, the functions of respiration and circulation would undoubtedly be impeded by it.

The effect upon the conformation of the cadet of the wearing of the coatee is particularly noticeable when, after his four years' course, he appears in the uniform of an officer, and it is a familiar sight in our Service. Instead of presenting a figure formed according to the canons of art for his sex—sloping inward from his shoulders to his heels—he presents a form similar to that of a woman as distorted by the corset—a figure defensible neither from an artistic nor a utilitarian standpoint. The lower ribs are compressed and a deformity of the thorax is produced which frequently requires several years of common-sense apparel before the elasticity of the young man's frame can entirely correct it. Atrophy of the muscles of the abdomen and loins is produced, together with a certain amount of displacement of the abdominal viscera.

In order to ascertain beyond question whether the alleged pressure of these coats actually existed or not, and if so, to what extent, girth measurements were made of fifteen members of the graduating class chosen at random, at the chest and waist, both over the coat and about the nude body. These measurements showed that *there was an average compression of an inch and a half*; in one case it was three and three-fourths inches, while in but a single one was there no compression.

It has been shown by Sargent in investigating the action of the corset upon woman, that compression of the chest adds greatly to the wear and tear of the heart. While Lowenfield has found that it has a direct effect upon the capacity for brain work. The amount of work which the brain can accomplish depends upon the amount of nourishment which it receives from the blood. But the amount of nourishment in the blood is dependent upon the amount of air which can be supplied to it, and this may be greatly influenced by compression of the chest and the consequent limitation of respiratory action. Moreover, in

considering the effect of this compression upon the cadet, it should be remembered that the coatee tightly surrounds the entire chest as well as the waist, so that its wearers do not even have an advantage equal to the tightly corseted woman, whose thoracic respiration is comparatively free, although her abdominal respiration is prohibited.

The digestive processes also are unfavorably affected by the compression of the waist, not only secondarily through the effect upon the circulation and respiration, but directly through the mechanical action of the ligation of the body, producing displacement, distortion and functional weakness.

If there be a predisposition to any disorder of either the respiratory, circulatory or digestive apparatus, the wearing of this garment would inevitably increase the tendency, if it did not actually become the exciting cause of the malady. It is worthy of note in this connection that one of those members of the graduating class, whose coatee exerted the greatest pressure, presented a varicocele of considerable size, the development of which could be attributed directly to the interference with the venous circulation afforded by his coat.

Upon careful inquiry into the grounds upon which its adherents base their desire for the retention of the coatee, four principal reasons were obtained :

1. It is vested with all the interest of tradition.
2. It is neat and military in appearance.
3. It gives the wearer a soldierly figure and a military deportment.
4. It has stood the test of half a century's use, and the officers graduated from the Academy during that time have been men of good physique who show no ill-health traceable to the use of the garment under consideration.

The first reason is purely sentimental in character, and while entirely worthy of consideration, other things being equal, should not be allowed to stand for an instant if the garment can be shown to be detrimental to health.

The second has no weight if a garment as neat and soldierly be substituted for it.

The third is based upon an utterly false principle. It is not desirable that the officers of the Army should be recruited from young men who owe their soldierly figure and military deportment to their tailors. These qualities are eminently desirable,

and every effort should be made to obtain them ; but this should be accomplished by the development of defective portions of the body rather than by atrophy of the more active ones, such as is produced by encasing the frame in an unyielding harness like the present dress coat. A scientific system of physical culture should be established, beginning with the first year and continuing throughout the entire course. The directions in which development is necessary in order to bring the cadet up to the typical physique, should be determined by a series of measurements and tests applied at his admission to the Academy, and repeated at suitable intervals. The deficiencies thus disclosed should be remedied by exercises expressly calculated to remove the defects. In this way the stronger ones will be more evenly balanced in their strength, while the weaker ones will not only be prevented from reducing their powers by an exceedingly unhygienic practice, but will have their physical defects corrected and their entire system educated up to the highest requisites of the soldier. The rejection of the present dress coat, with the occupation of a new gymnasium and the provision of a scientific course in physical education extending throughout the entire course, would serve to mark a decided step in advance—a step from the tyranny of the tailor to the gentle rule of Nature.

The fourth reason is the only one that carries with it any real weight, for it is specious and plausible. Admitting the truth of it, however, it should be remembered that the cadets at the Military Academy are picked youths chosen in the first place in many instances because of their fine physique as well as their mental capacity, and in every case required to have a certificate to the absence of physical disqualifications from a board of medical officers.

Nature is very kind and endures, without resentment, many indignities, and in the extent to which she permits the body to be compressed and distorted we have a striking instance of her consideration for human vanity. In the darker quarters of the earth the head is sometimes squeezed out of shape, and again, the development of the feet is retarded, and yet nature often permits the victims of vanity to attain a green old age.

Nevertheless, Nature is not equally lenient to all offenders, for, starting with a class of men supposed to be in exceptionally good physical condition, as the years of the course pass by the hitherto imperceptible physical defects crop out and the weaker

men fall by the wayside, until, through this sifting process, those who are sent into the Service are of exceptional vigor. They are the men who have been able to resist the sanitary defects of their environments; the weaker have gone to the wall. It is to be expected that the graduates, who have received commissions, should present no physical disqualifications—if they did, the medical examining boards failed to do their duty. In actual experience, however, would not those who succeeded in graduating have been still stronger had the course been free from unsanitary surroundings? And would not many, who dropped out for physical reasons, have developed a robust physique and added greatly to the strength of the Service?

It may be recapitulated then that the dress coat is objectionable because factors, inherent in its construction, co-operate to cause a compression of the wearer's chest and abdomen, producing a deleterious effect upon—

1. The mental apparatus by limiting the nutriment of the brain.
2. The respiratory system, by its mechanical obstruction to (a) thoracic respiration and (b) abdominal breathing.
3. The circulatory system, (a) increasing the wear and tear of the heart, (b) obstructing the flow of blood through the vessels and (c) inducing relaxation and dilatation of the venous canals.
4. The process of digestion by (a) the mechanical action of the ligature of the abdomen, and (b) secondarily through the effect upon respiration and circulation.

Against these arguments in opposition to the garment, the only valid reasons in favor of it are its age and beauty—facts which can hardly be considered of great weight when opposed to health and hygiene.

As a matter of fact, does actual experience sustain the opinion as to the deleterious effect of the wearing of the present pattern of dress hat and coat upon the health of the cadets? A reference to the medical records of the Academy will show that in his sanitary report for April, 1888, the Post Surgeon, Colonel Alden, completely answered this question by the statement that, "indigestion and headaches, attacks of nausea and faintness, and of exhaustion on parade, are more frequent among the cadets than they should be, and are due in some measure, at least, to this interference with circulation and respiration." Troubles such as these would be the natural consequences of wearing a garment like the coatee and a head-covering like the present

dress hat, and would, unquestionably, be obviated by the abandonment of these articles for others constructed with a proper regard for laws of health and hygiene.

Conclusions.—In view of the facts which I have here briefly summarized, it was concluded that the dress hat and coat of the Corps of Cadets were inherently faulty in their pattern and manufacture and that they were so productive of evil consequences to the wearers that they should be discarded and articles of a more correct sanitary character substituted for them.

The investigation being directed simply toward the sanitary aspects of the garments discussed, the question of the most desirable substitutes for them may be dismissed at the present time with but a few words. As regards the hat there seems to be a pretty general agreement among the officers consulted, that it might be satisfactorily replaced by a felt helmet of light weight. The white summer helmet is already worn by the cadets and makes a handsome and soldierly covering for the head. The gray color might be extended to the helmet which would enhance its beauty and utility. The helmet could readily be constructed so as to comply with all the requirements of health and would, at the same time, offend none of the canons of military propriety.

A blouse or tunic cut closely enough to the figure to display the form without compressing it, would be an advantageous substitute for the coatee. By various simple ornamental devices a blouse of this character could make a model of chaste ornamentation and would give to the wearer even a more military aspect than the coatee. Moreover, it would afford a satisfactory garment both for fatigue occasions and for mounted duty as does the blouse of the officer or soldier of the Army. The fact that the report of the medical examining board referred to has resulted in the recent adoption, as an addition to the cadet uniform, of a blouse which can be worn on certain occasions, does not diminish in any respect the force of the objections to the dress coat, which is still worn commonly enough to produce the evil effects enumerated, and the entire abandonment of the garment is the only means of doing away with its injurious action upon its wearers.

It has been thought, moreover, that a thorough discussion of the subject throughout the Service might conduce to this end and be productive of much good in other ways; the views here stated then are presented in the hope that, through much criticism and extensive comment, new points may be brought out and a general agreement be attained.

Reprints and Translations.

WAR AND THE BRITISH EMPIRE.*

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THE Art of War, which you study, stands in a peculiarly close connection with my own study of history. For history is concerned with states, and it is the state only which may or can make war. I am in the habit of laying it down that there are two kinds of history, first, constitutional, which deals with the internal development of that organism which we call by the name of state; secondly, international, which deals with the mutual action of states upon each other. Of late years I have been led to devote my chief attention to this latter kind of history, because I seem to perceive that it has been too much neglected among us. The result has been that the subject of war occupies me much more than it used to do. The constitutional historian may almost forget war; even the general historian may at pleasure neglect it, he may relegate it to a second place, and resolve, like Mr. Green, not to write a "drum and trumpet history." But the international historian must have war always in his mind, for the staple of international history is either war or else negotiations which have some reference to war. They may be intended to prepare for war or to avert war, but in either case they derive from war most of their importance.

Nevertheless the international historian does not think of war as you do, and he is wholly different from the military historian. In making war two agents are concerned, or rather an agent and an instrument. The state or government makes war as agent, but as instrument it is the service that makes war, the armies, the generals, the military advisers of the government. Now the military historian thinks of the instrument, but the international historian thinks of the agent. I should not consider myself entitled to say a word before this audience on subjects purely military. How a campaign should be planned, how a battle should be fought, how an army should be organized, disciplined, and maintained, these are questions on which I either know nothing, or only know what I have learned from such as you. But I may possibly be able to teach you something on the

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other aspect of war, the aspect which it shows toward the state. That is, I may have something to say on the objects for which war may be undertaken, the causes which may impel a state into it, and the effect it may produce in turn upon the state. At least I suppose your Committee thought so when they invited me to deliver this lecture.

An army is an instrument, but an intelligent instrument. Nay, much more than intelligent, for you are not mercenaries. You do not place yourselves at the service of the government in order to execute simply for pay whatever directions they may give. You are Englishmen, prepared to fight in behalf of England. Of all the citizens of England you are the least mercenary, for the thought of sacrificing life in the cause of the country is familiar to you, as in our present system of life it is not familiar to other classes of the community. And, therefore, it is surely all-important that you should consider your profession not merely as specialists but also as citizens and patriots. An army, I should think, must be in a healthy condition in proportion as it feels that it occupies a worthy place and discharges a high function in the community to which it belongs, and to feel this it must reflect on the history of that community and on the wars it has waged and is likely to wage. Does England make its army the instrument of a criminal ambition? Or does England really scarcely want an army at all? In either case—and both these assertions have been frequently made—you will feel less happiness in your profession than if you could feel both that you are wanted and that you are wanted for a good purpose.

I invite you then to look a little at the army from my point of view, which is that of the state. You are founded upon the Mutiny Act, your history goes back to the reign of William and Mary, and to the morrow of the Revolution of 1688.

This fact in itself is surely rather startling when we consider the vague notions about the progress of civilization which are current. We are told that war is a survival from a barbaric time when the happiness of the people was sacrificed to the pride of kings and aristocracies, that war, therefore, necessarily recedes into the background as civilization advances, and that it may now be expected speedily to disappear altogether. How is it that men seem so totally unable to grasp the largest, the most glaringly manifest facts that history offers to them? It was at the Revolution of 1688 by general consent that civilization in England made its decisive advance. Then in a moment our government doffed its medieval dress and donned a modern attire. Then the interest of the community was triumphantly asserted, and the merely royal or dynastic interest lost its unjust precedence. Did peace then follow? Were armies disbanded? Nay, one of the first steps taken by the new government was to found an army, and this army has endured ever since.

No doubt it was at first a very modest force, such as the most peacefully disposed government might think it prudent to maintain. And if the progress of civilization is to be measured by devotion to trade, no doubt civilization advanced steadily in England from this time. We became the greatest trading nation in the world, and foreigners began to call us "the

modern Carthage." Very well then, we ceased from that time to make war? Why, on the contrary, it is well known that the great period of English wars now commenced. In a century and a half we waged seven wars, of which the first two and the last two were alike, according to the standard of the time, of gigantic magnitude. By these wars we incurred a debt of £800,000,000, and modern Liberalism, while it admires the Revolution, condemns as profligate and ruinous the military policy which came into fashion with the triumph of revolution principles.

Is there not something wrong here? And observe how precisely the same blunder has been repeated since. France had her revolution a century later. It was far more radical than the English revolution, founded far more frankly upon the progress of civilization and humanity. Those who paved the way to it were never tired of declaiming against the barbarous wickedness of the wars waged by the kings of the earth. The whole system was swept away as by a whirlwind; the brotherhood of peoples was proclaimed. And lo! war began forthwith, and raged for twenty years on a scale till then unparalleled. It did not cease until the whole military system of the continent had been remodeled so as to make armies larger than before, and, as it were, to popularize war. And now that a century has passed since the French Revolution, and what was then called the progress of civilization has advanced several steps further, now that all governments are more or less popular, what do we see? We see Europe wearing the appearance of a vast camp. We see Russia, Germany, and France reckoning by millions the military force they are able to put into the field, and we watch with dismay the gradual approach of a struggle between civilized nations which seems likely to eclipse in magnitude all that has hitherto been known among barbarians.

I have not space here to examine this curious discrepancy between theory and fact. Enough that it seems evident that governments may become popular without becoming peaceful; this is proved by the course of the continent since the French Revolution; and again that nations may devote themselves to trade without becoming peaceful; this was shown by England in the eighteenth century.

My business here is with England. The question how it happened that after our government had become popular, and after the nation had begun to devote itself to commerce, England waged war more frequently and on a greater scale than ever before, is evidently a historical question. But it is just such a question as ought to be interesting to soldiers, because it may teach them to understand what part the army has played in the development of the country, and it will probably lead to conclusions about the part it is destined to play in the future.

When it was first perceived that the revolution of 1688 had saddled the nation with a European War, when after so long a resistance, Parliament was compelled to admit the principle of a standing army, England might still hope that the circumstances were exceptional and would soon pass away. They could have no suspicion that they had entered upon a century of wars. For the ground of that first war was simply the revolution itself. Louis XIV. chose to intervene in behalf of James. Of course such interference

must be resisted, but as it was to be hoped that new Revolutions would not take place, so it might be presumed that there would be no occasion for new wars. And so the parliamentary army might remain always the modest force it was at first; and the National debt which now for the first time took shape might also remain an inconsiderable burden.

But when this war came to an end after eight years, it was followed after an interval of only five years by another great European war, that of Marlborough, which lasted eleven years, and the army began gradually to wear the appearance of a permanent and growing institution. Politicians became anxious, and, observe, especially politicians of the Tory school. William and Marlborough seemed to them to bring back the days of Cromwell, the father of standing armies. They looked forward to a steady growth of taxation and debt, and they thought that, as in Cromwell's time, English liberties would gradually fall into abeyance. But after 1713, a period of peace set in. Our armies and fleets had little work to do for twenty-six years, until war with Spain began in 1739. In this period falls the ministry of Walpole, our first great minister of non-intervention, peace, and retrenchment, and it might for a time appear that he would succeed in averting the danger, and that under his prudent management the debt and the army alike would gradually become evanescent.

But a new disappointment befell us. In 1739 Walpole was forced into war by the clamour of the people, and after this date war succeeded war in a series which seemed interminable. From this time till the fall of Napoleon, England had no period of peace longer than a dozen years, and out of seventy-six years she spent forty-five in war. We have not the habit of viewing these wars in connection. In particular the half-forgotten wars of George the Second's time appear to us wholly disconnected from the wars which followed the French Revolution. I think this view is superficial. To me all the five wars appear closely connected; nay, I have the habit of regarding them as a single grand war, a great duel with France.

What is the explanation of this duel? Surely some large fixed cause must have been at work to produce this perpetual recurrence of war. For certainly the nation was not then warlike, at least not till the elder Pitt roused it. There were times when observers almost despaired of a nation which seemed to them sunk in peaceful sloth and degeneracy. James Wolfe in his letters charges the officers both of army and navy with—what? want of skill? want of professional knowledge or intelligence? no! but with actual cowardice! And you know that when George II. heard this very James Wolfe called a madman he said that if Wolfe was mad he only hoped he would bite the other generals! Moreover, repugnance to war was almost as much a principle then as it is now, though on a different ground. If now we dislike it on grounds of humanity, it was regarded then as fatal to constitutional liberty by providing the government with an overwhelming military force. Yet in spite of these peaceful views and habits we plunged into war after war.

The truth is that though we speak as if trade were opposed to war, and as if the spirit of trade must drive out the warlike spirit, nothing is more manifest than that in the eighteenth century war and trade played into

each other's hands. In that age it might be said that the more trade the more war, and the more war the more trade. It was for trade itself that we waged all those wars, and if that age was the age of war in English history, the simple reason is that it was the age when English trade flourished more than it had done in earlier times.

There is nothing wonderful in this. Throughout the history of the world trading states have made war for trade, and it has been their policy, as was said of the elder Pitt, to make trade flourish by means of war. In ancient times was it not Carthage that produced Hannibal? Why did Venice engage in war? Why did she overthrow and partition the Byzantine Empire and raise a new empire upon its ruins? She did it for the sake of trade. In like manner for the sake of trade Holland made war in the seventeenth century; and it was most natural when England, in the eighteenth century, supplanted Holland as the great trading state of the world; it was most natural, I say, that she too should make war.

But the foreign trade of England is closely connected with the Empire. In fact the two things grew together. Or rather the words are but different names for the same thing. Where our fathers said "trade," we in these days say the Empire, and those wars which in the eighteenth century appeared to be waged in order to make trade flourish or prevent it from declining, appear now, when we look back upon them, to have been waged for the purpose of founding or defending the Empire.

In and for these wars our army grew. It is not so much the army of England as of the British Empire. When we had no empire we had no standing army, but as our empire formed itself we found it necessary, against our will, against all our most cherished convictions, to create, to maintain, and steadily to develop, an army.

I wish we could learn to conceive, as a whole, this period of war which covers the eighteenth century and extends to the fall of Napoleon. I wish we could apprehend clearly the unity of it. It is the period of our great triumphs; it is the period of our expansion; it is the period of the national debt. These three things belong together, the Army, the Empire, the Debt.

The popular notion is that we engaged in these wars from quarrelsomeness or a half barbarous love of war, while some ministers, as Walpole, vainly strove to incline us to trade, and perhaps that the intelligent middle class were really disposed to trade, but that the governing aristocracy could not be restrained from war. And we imagine that the wars sprang up in Europe out of quarrels with our European neighbors, while the trade went on in the New World. The truth is that war and trade went hand in hand throughout the period; it was because we were devoted to trade that we engaged in war; the wars were waged in the interest of the trading classes, and the grounds of war in the main were found just where the trade was, that is, in the New World.

You may, perhaps, think that I take up a scarcely tenable position. You will admit, of course, that some of these wars of the eighteenth century had colonial objects. Clearly in 1739 we waged war with Spain on a question of American trade. And the war with France in which Wolfe and Clive

won their laurels was waged in the American colonies and near the Indian factories. But did Marlborough at the beginning of the period, you will ask, or did Wellington at the end of it, fight for trade? Is it not well known that the question at issue in Marlborough's war was the succession to the crown of Spain, and that he fought not in the New World but in the Low Countries and on the Danube? Wellington fought in Spain and in the Low Countries, and the object of his battles was to reduce the excessive power of Napoleon and at the same time to restrain the dangerous principles of the French Revolution. In general, you may say, our army was kept on foot in order to maintain the balance of power in Europe, that balance of power which now perhaps most people regard as a chimera.

Well! no doubt in state papers and parliamentary speeches there may be found many splendid flourishes of expression, and when we fight in alliance with other powers we make the objects of those powers to a certain extent our own. But I maintain that all these wars had substantially the same character, and that all of them alike arose, not out of European considerations, but out of our foreign trade, that foreign trade which gave us our Empire. I do not go back beyond the eighteenth century. I do not include the war of William III. himself; that no doubt was no war of trade. But look for instance at the war of Marlborough. I care not where or in what way it was waged. But when I examine its origin, when I remark how openly the English public declared that they cared nothing about the Spanish succession, and then watch them gradually and on reflection changing their mind, I can perceive clearly what considerations influenced them. Spain was the great New World Power. Upon Spain in the commercial world everything turned. Our trading class perceived that it would mean ruin for them if the Spanish Monarchy should pass into the hands of a Bourbon. For it would mean that our great commercial rival, France, would obtain the control over trade and a power, which she would certainly use, of excluding us from the commerce of the New World.

If this is so, you see that Marlborough's war is essentially of the same kind as our next war, the war of the *Guarda Costas*, the war of Jenkins' Ears. Both alike are wars arising out of the American trade and the relation of Spain to it. But did we not clearly fight for the Austrian succession? What had the rights of Maria Theresa between 1740 and 1748 to do with trade, and were we fighting for trade at Fontenoy and Laufeld? I have not space to explain the complicated circumstances which led to the memorable declaration of war by Louis XV. in 1744. But in Austria we saw principally the Low Countries, which we ourselves had put into the hands of Austria, and in the Low Countries we saw trade—the trade of Antwerp and Ostend. What strikes me particularly here is this. The war of England and France which then began did not really end when a treaty of peace was patched up at Aix-la-Chapelle. It raged on through eight years of nominal peace until it was lost in a second war. In fact, a twenty years' duel took place between the two powers. Survey that struggle as a whole. This is the decisive struggle of which the prize is the New World. This is the struggle which gave us Canada, and in the end gave us India.

We did not foresee so much when we entered upon it, but we did foresee results of this kind, that is, we had in view colonial and commercial results.

Thus through the first sixty years of the eighteenth century I trace a steady advance of English trade, supported by English arms, until our rival, France, is practically expelled from North America, and is reduced to inferiority both in India and on the sea. And in the second period, almost equally long, from the beginning of George the Third's reign to the fall of Napoleon, what do I see? Here are three great wars, the American War, the War of the French Revolution, and the Napoleonic War. I see nothing in these but the natural and necessary sequel of the former struggle. France was not likely to put up with her defeat. Our Empire once won would have to be defended. The former series of wars has been for the acquisition of the Empire; this series is for the defence of it.

I think this would be plain enough but for the bewildering and dazzling effect of the French Revolution. In the bombast of rhetoricians and popular historians the Revolution is a sort of new beginning, an entirely new chapter in the history of mankind. Nothing can be more groundless, even if we look at the Continent alone, which was far more vitally affected than England could be by the Revolution. Even on the Continent the wars which followed the French Revolution were by no means produced exclusively by it. The Polish question, the Turkish question, all the questions raised so recklessly by the Emperor Joseph II., contributed almost as much as the Revolution in France to the general convulsion. But in the relations between England and France the Revolution really produced little alteration. No new struggle began, but the old struggle was resumed with new energy. France had already struck a blow which had half undone the work of Pitt, Wolfe, and Clive. The new British Empire was already almost in ruins. By co-operating with our insurgent colonies France had deprived us of the greater part of America; by co-operating with Haider Ali she seemed to have shaken our power in India. If no Revolution had happened, she would probably have pursued her advantage. The struggle would have gone on. But the Revolution was for France military regeneration. Naturally, therefore, it led her to take up again with quite a new ardor the enterprise of restoring her New World Empire, lost thirty years before, and of destroying that of her successful rival. And what might she not have done, had but her navy been regenerated as was her army? As her regenerated army subdued almost the whole Continent, so would such a regenerated navy have subverted the British Empire.

With the fall of Napoleon the whole development we have been tracing seems to come suddenly to an end. Before that, seven wars of England and France in a century and a quarter; since that not a single war of England and France in three-quarters of a century! Before that a national debt steadily increasing until it reached an almost fabulous amount; since that a debt dwindling, while everything else, wealth, population, commerce, empire, grows enormously!

As the whole struggle seems to me one, I explain this result by the completeness of our victory. The duel was for North America, India, and

in general, for supremacy in the New World. France would maintain it so long as she had the means of doing so. So long as her fleets kept the sea, and she had Louisiana in North America, Mauritius in the Indian Ocean, and allies among the Indian Princes, so long the struggle might continue. And Napoleon might imagine a new route to India, and might take possession of Malta and Egypt. He might at the same time, by acquiring an ascendancy over Spain, get control over Central and Southern America. But when he fell all this was at an end. He had parted with Louisiana, he had lost Malta, and Egypt, and Mauritius. He had lost Spain, not to mention that Central and Southern America were on the point of being divorced from Spain. Above all, he had been completely defeated in the naval war, and the English, not the French flag, was supreme on the ocean. Accordingly in the next age France had no materials for commencing a new rivalry with England in the New World.

Thus ceased suddenly that great struggle; it ceased seventy-four years ago. We may contemplate it as a whole, and draw the moral of it. One reflection we have made already, namely, that it was not a hindrance or interruption to trade, but one important aspect of the advance of British trade. Trade alone took us to North America and to India; it was for trade that we made war, and the rivalry with France which led to so many wars was a commercial rivalry. Another reflection is suggested to us by the termination of this struggle and the long period of repose that followed. Our age has been much occupied with the idea of a general progress of humanity, and it has accordingly looked eagerly for signs of the disappearance of War and of an approaching millennium of Peace. Some forty years ago many thought this consummation was really at hand. Since that time we have witnessed war after war, and all millennial anticipations are checked when we look at the actual condition of the Continent. Nevertheless, some may still imagine that for England, at least, the millennium has arrived. For we have had no share in those gigantic wars. In the Italian War, in the American Civil War, in the German War, in the Franco-Prussian War, in the Russo-Turkish War we abstained from actually drawing the sword. And the simple fact which I have already mentioned, that after waging seven wars in a century and a quarter we have since passed three-quarters of a century in Peace with the Great Powers except for one war of two years with Russia—this fact is undeniably very striking.

What is the explanation of it? The notion that we are wiser and more civilized than our ancestors of the eighteenth century, who retained a kind of barbarous or medieval combativeness, is not supported by facts. In general those ancestors had almost as little inclination for war as we have. The growth of the debt appalled those generations, and if they did not talk as we do about humanity, they were restrained from war by a fixed idea that armies were fatal to constitutional liberty. The memory of Cromwell and his army oppressed them like a nightmare. Again they did not perhaps talk with so much unction about the civilizing influences of trade, but for their devotion to trade they became proverbial in Europe, and earned for England the epithet of "the modern Carthage."

In short, if they made war it was not for love of it, but for this reason, that in the pursuit of trade they met with certain obstacles, with a steady formidable opposition from France. Now if we have not made war the simple reason has been that we have not met with this opposition. In spreading ourselves over North America and establishing ourselves in India in the last century we were encountered by the French. But in the present century while we have spread ourselves over Australia and South Africa and eastward from Canada to the Pacific we have not encountered the opposition of the French. Therefore, in the last century we made war with France, and, therefore, since 1815, we have remained at peace with France. Nor have other rivals much interfered with our expansion. In short the settlement of 1815 gave us in this respect a most advantageous situation. For that reason, and not on account of some change in our way of thinking, it makes such a landmark. Before that time our expansion had been hindered and contested by neighbors and rivals, and therefore it had led to war; but since that time it has been unfettered, and has not required the aid of war.

We see the world now changing fast around us. In my opinion we are much deceived if we fancy that the peaceful uninterrupted expansion of the Victorian age will continue after the conditions of it shall have been altered, when we shall find ourselves again in the presence of neighbors, and those neighbors, detecting weak places in our armor, take courage to become our rivals. It will avail us little then to say that we sincerely love peace, that the idea of war shocks us; in the eighteenth century, too, Walpole was shocked at the growth of the debt, and the Tories were scandalized by the growth of the standing army, and yet in spite of all this repugnant war broke out once in about every dozen years.

And now the new, the Victorian Empire of England, begins to have neighbors. France is one, but only one, of these. Not this time in America or India, but in Africa, we begin to feel her rivalry. And if Emperor Boulanger I. should commence his administration of foreign affairs by peremptorily ordering us out of Egypt, what shall we do? What will our new, our more civilized view of war suggest to us? In Africa almost all the European powers begin to have a stake, not France only, but Italy, Spain, Germany, Portugal, Holland. In Africa materials are accumulating which may furnish the twentieth century with as many wars as America furnished to the eighteenth.

In that century France encountered us not only in America but in India, We do not meet her there now, but what then? We meet Russia. Why, after all, have we enjoyed this foretaste of the millennium? Clearly because, with all the wild speed of her advance, Russia has not till now been able to traverse the space that divided her from us in India. But she has almost finished that task now.

Or, perhaps, we have had our millennium, and it is about to expire. For I read: "When the thousand years are expired, Satan shall be loosed out of his prison, and shall go out to deceive the nations which are in the four quarters of the earth, Gog and Magog, to gather them together to battle, the number of whom is as the sand of the sea!"

This indeed is the burden of all prophecy, that after the Golden Age war shall revive—" *Erunt etiam altera bella, atque iterum ad Trojam magnus mittetur Achilles!* " It will be safest to regard the Victorian half century not as a consummation, but as an interval, a happy period of respite.

But if we have other wars, the new series will be, I think, like the old. They will not be wars of England, but wars of the Empire.

I dare say this address has been somewhat unlike former addresses that have been delivered before this Military Society. It is probably less practical, indeed, if new light was to be thrown upon military subjects, I ought to listen and you ought to speak. But I think those large historical outlines which I have drawn do lead to certain conclusions which may be called practical, or rather perhaps they dissipate certain prevalent misconceptions that have results only too practical.

Listen to what our colonists often say; "We are sincerely attached to the old home; but is it reasonable that we in New Zealand or Canada should find ourselves dragged into war because of the endless quarrels of the Mother Country with her neighbors in Europe?"

And what do the trading classes at home say? "The English love peace; they desire only to prosper by honest trade. But an aristocratic government, following its barbaric instinct, has dragged us into war after war, and has plunged us deep in debt."

Such views must damp the zeal of military men, who are made to appear as if they stood outside the healthy life and development of the nation, and constituted not so much an organ of the body politic as a kind of excrescence upon it.

If my slight outline has been accurately drawn, this view is wholly an illusion. You may tell English trade that you have been from the outset its instrument, that you sprang into existence along with the trading policy of England, and grew with its growth. You may tell the Colonies that it has been your great work from the outset either to found or to protect them, that England has not engaged in European wars against their interest, but that the wars of England have been from first to last undertaken in the cause of the Empire, so that it would be far truer to say that the Colonies have dragged England, than that England has dragged the Colonies into war. And you may tell yourselves that you trace your origin to the Revolution of 1688, that you have been a great and necessary instrument in founding this unparalleled world-realm, that you carried it through its great work, and bestowed upon it a happy Victorian age, and that now you stand waiting, happy not to be needed, but ready at need.

DISCUSSION.

The CHAIRMAN said: I must dissent from one expression that the lecturer used, namely, that the lecture was not practical. Some years ago one of the best military lecturers we had in the Army—Charles Chesney—said the duty of a lecturer was not to assert certain opinions, or allege facts; but to lead his hearers to think out a subject for themselves, and to make further researches on the matter which he puts before them. I have no doubt I must be expressing some of your feelings, as I am expressing my own,

when I say that Professor Seeley has given me a great deal, if I have time, to read about, to search, and try, and follow out some of the conclusions at which he has arrived. Following the occupation of a soldier, I must say I had never grasped the whole subject in at all the complete way in which he has. He has startled me in some things. I never conceived that the duel with France was so continuous as he has pointed out to us. He has talked like a soldier's advocate as against people who say the people do not make war. No soldier could have put it better than he has done. It has been truly said that "Trade follows the flag," and the lecturer has in eloquent diction shown that the flag, *i.e.*, the army, follows trade—is in fact dragged behind it. He has expressed more happily what has been said to me many times by the Kafirs, "We do not really like you, Massa, first comes missionary, then trader, then soldier." That is the outcome of the Kafir's experience. This is what has been occurring in Europe. We may be right or we may be wrong, but nearly all our wars have had something to do with either trade or missionaries. The Abyssinian War was caused ostensibly in the interests of the missionaries, and in the Ashantee War the cause was similar, for King Koffee would not give the missionaries up whom he had detained. But practically it was a trading question.

Major E. T. H. HUTTON, D.A.A.G., King's Royal Rifles : I think a few remarks will not be out of place, which I am quite sure represent the feeling of the rising generation of officers in this camp, upon the subject of this most able and interesting lecture. Professor Seeley, as we are all aware, is one of the leading thinking men of our time, and his especial study has been this subject, *viz.*, the Empire, and he commenced his address to us to-day with these remarks, and we should hardly pass them over without some reference : "An army must be in a healthy condition in proportion as it feels it occupies a worthy place and discharges a high function in the community to which it belongs." I am quite certain I express the feeling of the officers of my own standing, and of the rising generation of officers, when I say that we should be sorry if we were to return to Cambridge without the assurance from us that we do feel the important position we hold with reference to the Empire here and throughout the world. As Professor Seeley has shown, it has been the privilege and honor of the British Army to make this great world-wide Empire, so also is it our pride and honor to maintain it. I can only assure Professor Seeley that we feel our responsibility deeply, very deeply, and in the discharge of our duties as officers towards those superior to ourselves and towards those whom we command we have the maintenance and welfare of the Empire profoundly at heart, and that we are in the best sense of the term both patriots and citizens. (Applause.)

The LECTURER : I have been asked some questions which are very large, but I quite admit they grew out of my lecture, and I hardly know how to deal with them. Sir Evelyn Wood asked us whether the character of wars in our own time were popular, or wars waged by the upper classes and the sovereigns. I almost think it is a pity to generalise too much on this question, and ask ourselves, Do common people like war or do they not like it ; or, Do sovereigns like war, or do they not ? I cannot give any gen-

eral opinion on that; the question turns upon the amount of interest involved. If the people find some very great object which concerns them, they will be prepared to fight for it; on the other hand, sovereigns may perceive cases of national interest which the people do not perceive. During the last century sovereigns, for dynastic reasons, constantly pushed the people into war. I cannot lay down any general proposition on the subject. In English history there has always been one cause attending the wars during the period of which I speak. It has not been in the interest of the sovereign, the aristocracy, or, till lately, the common people. It has been the interest of the trading classes. Sir Evelyn Wood has asked about certain foreign powers, and raised the question of the Italian War of 1859, and the Prussian War of 1866. I confess I was somewhat surprised when he said the Austrian War was not a war of the people. My information has been opposed to that. I have heard it said by Prussians that Bismarck had the war so well in his own hands, that he said, "Why, if we had received a check in Bohemia the women would have beaten my brains out with broomsticks!" Colonel Jelf has raised a large and general question as to whether the progress of civilization, enlightenment, and Christian morality had in the last century or so not had any perceptible effect that could be counted upon as being likely to diminish the wars of the future, I almost gathered in the course of what he said that he considered there have been fewer wars in the last century than previously. Well, after 1815 there were a fewer number of wars, if you put aside the Russo-Turkish War and the war in Greece, but since 1850 the number of wars has been greater and not smaller than in the last century.

Colonel JELF: I wish to refer to England only.

The LECTURER: England, as I have said, for special reasons, has been aloof from war, but in general the progress of civilization, enlightenment, and the preaching of Christianity have had no perceptible effect; and this seems a point which is constantly overlooked. I said the progress of popular government has had the effect of producing war instead of diminishing it. Is this not obvious? It is astonishing that people should suppose that by popularising a Government they would diminish war: they would increase war—I mean to say increase the magnitude of it. Why? Napoleon's last wars were conducted on a gigantic scale because he had the people at his back. No Napoleon could exist in the eighteenth century, and even Frederick knew that he must not push things too far, because he had not got the people at his back. But as soon as a sovereign is raised to power upon a popular revolution, and knows he has around him people whose minds are awake and alive, he might fight as much as he likes, because he is fighting for them. He might spend and squander their lives, because it is stated to be in their own cause. It may not be really in their cause, and he may cheat them. Supposing you have given a purely dynastic Government, lives may be squandered up to a certain point, but not beyond. It must be a prudential Government. I have read military writers who say that in the age of Frederick, and before his reign, the generals were afraid to squander life; they did not like large battles; they preferred scientific manœuvres to close quarters; they were afraid to squander so

much life in quarrels which they knew were not the quarrels of the people or the quarrels of the nation. My answer to the question, whether the progress of civilization, enlightenment, and Christianity are calculated within themselves to diminish war, is, that they make the horrors of it much more evident, and, if any substitute could be thought of, no doubt those factors would lead the people to adopt it; but, as a substitute is not provided, I am bound to say that one of the advances made in the present day, viz: the popularising of Governments, has effected the popularising of war, and therefore one of the greatest factors of modern progress tends to increase and not diminish war.

LETTERS ON INFANTRY.

BY PRINCE KRAFT ZU HOHENLOHE INGELFINGEN.

Translated by COLONEL R. P. HUGHES, Inspector-General, U. S. A.

V.

ARE FURTHER CHANGES IN THE DRILL-BOOK DESIRABLE?

YOU are greatly in error if you have gotten the impression from the conclusion of my last letter that I do not wish any change in our drill regulations, because I maintained that the regulations now in use were equal to the demands of the new, improved arms. In case you may wish to know what changes I think desirable, I will submit them to you:

In the first place, the drill regulations have been so badly edited that it is very difficult to follow them. The contents could have been arranged very much better. It seems to me that the members of the commission who drew up the drill regulations of March 1, 1876, were not always united in opinion, and that, in consequence, they were under the necessity of making concessions and compromises. This supposition is strengthened by the fact that the new drill regulations of 1876 are not entirely new, but are given as a new edition of the drill regulations of February 25, 1847, with the changes that have been authorized and made up to the 1st of March, 1876; and the old arrangement has been adhered to, and the new material interjected in the appropriate places. The result of this is, that one must look in various places for the most important things in the book—for active or battle tactics we must hunt up what is said in the Schools of the Company, battalion and brigade, and compare them before we can be absolutely clear as to the real meaning of the regulations. This makes the study of the drill-book difficult. It can, of course, be strongly contended that that is no fault, for it compels the officer to study the tactics with great care and diligence in order to get at the spirit of the matter. And, God be praised, the matter stands so with us, that the drill-book, with all its changes and modifications, is still the result of the experiences of the last hundred years, and nothing can be attributed to the mood of the moment,

and it is a good thing if the officers are compelled to busy themselves a good deal with its contents. But in the execution of what is laid down in various places, one is left in doubt, at times, as to the real intention in regard to a good many things. That is unfortunate, for a drill-book should not admit of any doubt. It should be published as military dogma, and doubts and criticisms should not be tolerated. For illustration, I will point out a doubt by asking a question, Do the tactics authorize a battalion that is advancing to the attack, with music playing, to halt in order that it may load and deliver volleys? Paragraph 49 prescribes that the advance in line shall be with music playing; but this paragraph is part of Chapter X, which relates to formations in three ranks, as do also Chapters XI, XII and XIII. It is only after reaching Chapter XIV that the formations for battle are taken up, and then it is explicitly stated that in these formations the troops are formed in two ranks. But in paragraphs 14, 15 and 16, which provide for the formations for action, the advance with music playing is not mentioned, and one arrives at the conclusion that the advance of a battalion in line is only authorized in the three-rank formation, and that the movement is only to be used as a final test of efficiency of a battalion in drill, and that the advance in line is no longer practicable owing to the precision and long range of modern weapons, and should not be attempted inside the danger zone of the enemy's fire.

After having arrived at this conclusion we come upon paragraph 88, which, in opposition to all this, begins with these words—"The bayonet attack of a battalion advancing in line will be" * * * although we have as yet heard nothing about a battalion advancing to the attack in line.

According to the words above quoted we are certainly justified in thinking that the tactics do not forbid a battalion to advance in line in action. But there is nothing in the tactics showing how this advance in line in two-rank formation is to be done, nor is it stated whether this advance is to be accompanied with music or not, or whether the colors are to take the lead.

Permit me to invite attention to a second doubt.

Can the commander of a battalion advancing in line give such a command as, "To load—halt!" This command really appears in paragraph 43, and is applicable to a detachment in close order that has been held in support of the skirmish line of a company, and that is pushed forward into the firing line. One would think that a battalion advancing in line for the purpose of opening fire could not afford to lose a single second of time in making reply to the formidable fire with which it would be received.

I must honestly say that my studies over this matter have not caused me many gray hairs, for I am fully convinced that a battalion will never advance in line—into the fighting line in actual war, and also that the command, "To load—halt!" will never be given to a whole battalion in action, and that if such a thing were attempted by a battalion commander it would not be executed. The officer drilling his battalion is troubled over such doubts in exact proportion to the strictness with which he adheres to the text of the drill-book, for he is not certain whether he may or

should execute such evolutions. If he executes them, and his action does not meet the approval of his superiors, he has violated the regulations; if he does not instruct his troops in them, and the superior should call upon him to execute them, then his troops are held to be unsatisfactorily instructed. Such doubts are, therefore, very injurious, because they breed distrust of the drill-book, and for that reason a new edition is very desirable.

I cannot resist mentioning another wish which is much more important. When I consider that the skirmish line is the formation in which our infantry will habitually fight in the future it is, in my opinion, of very little consequence whether the close formation, in which the supporting troops and the columns move, is of two or three ranks. But it is my opinion that we should have but one formation for infantry in close order. We now have two formations. The three-rank formation is the fundamental one, but the drill-book gives the two-rank formation as our fighting order. Is it not an anomaly that our fundamental formation may not be employed in action? During the whole of our last War infantry was never seen to move otherwise than in the two-rank formation, and the first occasion that I saw the infantry in the three-rank formation again was in the review at Longcamp after the conclusion of the preliminary treaty of Peace. How much more simple and more intelligible would our drill book be if we had but one formation.

The two formations that we now use were transmitted to us from the time when it was customary to deploy only the third rank as skirmishers. Since the introduction of the breech-loader all the men are equally well instructed in this work, and since small arms have been so highly improved as to fix that, the decisive action must be fought out in open order, and that close masses can very rarely move in the zone effectively covered by the enemy's rifles, the last good reason has disappeared for any formation other than our fundamental one.

My one great wish is, that our drill-book should permit but one formation, either the two ranks or the three ranks.

I have found that having two formations results in many inconveniences. A permanent division of the company into platoons, half-platoons and squads is of no little value in action. If the company is formed in three ranks and the skirmish line is formed of the third rank, the then two-rank formation leaves the entire system of minor commands in a broken condition. But if the squads are formed upon the two-rank basis, then the three-rank formation is a chimera, or at least it is no longer the fundamental formation. During the War it was natural that the companies should be divided into *squads*, because they always marched, stood and fought in two ranks.

During Peace there are other inconveniences resulting from having two formations that consume much time uselessly and shorten the hours of instruction by just that much. In the first place, it takes much time to make the recruit clearly understand that he now belongs to this and again that platoon, that he owes implicit obedience now to this and again to that non-commissioned officer or officer, and must be constantly on the alert

for orders. It is to be noted that not a few drill masters take pride in the fact that the skirmishers can be deployed while the company is in motion and assembled again as the third rank without any break in the cadence. The drill-book forbids making this movement a requirement in the inspection of a battalion. But the men of the "good old school" and some enthusiasts employ this movement in all its various complications. The commands may be heard in some such order as the following: "Right in column," then "Battalion, March," then "Form comp column," "Break into sections," "Form third rank," "Battalion, March," "Left about," and once again "Form third rank," and much more of such nonsense as may be originated by a drill master on the parade ground with cold feet and an overheated brain. When the drill master failed to bring the battalion into confusion by means of the most complex combinations his face lighted up with a satisfaction that is rarely seen.

Upon witnessing such a display it was not possible to avoid commending the zeal of the drill master and the devotion of the men, but I could not suppress the query: Wherefore all this? The customary answer was, This is done in order to make the men expert. Old drill masters who have practiced this thing from their youth up, and who have convinced themselves that the drill ground is the only means for preparing the troops for battle, have granted to me that a change of formation "in step" did not make the men expert in anything else. They called it "drill ground trial," done in order to throw sand in the eyes, and the movement failed at once if for any cause there were changes made in the "flugelmen" of the sections. Much time and exertion is wasted upon things that do not have any effect in qualifying the soldier for his duty. Such a great waste of time would not occur if we had but one formation. A much better means of making the men expert in drill is to exercise them without regular formation, as authorized in paragraph 43 of the drill-book. We very seldom see this done.

Do you ask me which I should choose, the two or three-rank formation, if the decision were left to me? No? You do not ask that. You take it for granted that I would choose the two-rank formation. But hold. You have mistaken me. At first glance I would be inclined to say that it is a matter of no moment whether we employ the two or three-rank formation,—and one of the most competent authorities in our army answered me to this effect upon my asking his opinion, and said that to his thinking the infantry would, hereafter, fight only in open order. But if I had to decide upon the question, I would adhere to the three-rank formation. I would prefer the three-rank formation even for skirmishers, the three men of each file being instructed to hold together and to support one another, with files of but two men, in case one is wounded the other man is isolated and alone. There are many other considerations that can be used in advocacy of the three-rank formation. In two ranks the company is too long when raised to its war strength, and it is difficult for the company chief to make himself heard. In my opinion the various columns (Platoon, Half platoon, Section) are much more manageable in three ranks, and can be conducted across rough ground much easier; in any case the columns are not so deep

for the distances between subdivisions is less, and in marching by the flank the column is much shorter.

I cannot conceive of any serious inconvenience arising from this formation. Should a supporting detachment in close order or a company find itself in position to fire by volleys, the three-rank formation need not prevent its giving full effect to its volleys. Our drill-book speaks of volleys delivered by four ranks. On the contrary, troops formed in three ranks are easier to control than when formed in two ranks, which is of great importance when many volleys are to be fired, during which targets and elevations are to be changed. But I think I heard a drill master ask: How would you deploy your skirmishers when a battalion is advancing in line, for example, if the first half platoons of the companies advanced as skirmishers at the signal "Deploy," would there not be holes left in the line of the advancing battalion?

With a full appreciation of the inconveniences that might arise therefrom, permit me to suggest, that a battalion advancing in line in close order, either in company columns or in line, should deploy the half platoons of the two flanks of the battalion upon the signal "Deploy skirmishers" and then the next two, etc. It is true that such a course would widen the intervals between battalions advancing in line, but I do not think that that consideration has much weight with the long range of our present rifles, especially when it is taken into consideration that we may never again see several battalions advance in line in close order against a real enemy.

There is much to be said in favor of the three-rank formation, and I know of nothing that can be said in favor of the two ranks. But hold! Did I hear you say "the square?" You are joking. I have carefully studied the General Staff history of 1866 and 1870-71, and in all six volumes I have failed to find a single case mentioned in which the Prussian infantry formed square, except that of the first battalion of the Grenadier Regiment No. 11 in front of Langensalza. All other cavalry attacks were overthrown without forming square. Therefore, I can be pardoned for not having thought of the square. There is another change that I should endeavor to effect if I were to sit as a member of a committee on drill regulations. I would try to do away with the "Carry arms" entirely. The Austrians have demonstrated the fact that it is possible to come to a Present from a *Gewehr-Uber*.*

This being the case, honors could be paid by coming to Present arms directly from the *Gewehr-Uber* instead of to a Carry as is now done in Austria. If you are astonished that I thus announce myself as an enemy of the "Carry arms," just come with me to the nearest drill ground for recruits and let me show you how much precious time and trouble it costs to teach the soldier to carry arms, and how much military work is spent in securing this. The man must not carry the butt of his piece too far to the front and so mar the appearance of the front of the line, nor so far to the rear that the piece will tumble forward. The passing in review at a Carry

* This cannot be translated into any of the terms in our manual of arms; the "Slope arms" of Scott's Tactics is probably a close translation.—Translator.

should also be abandoned. If, by great care and labor the troops are taught to move with a free, natural and easy step we shall find it become constrained and fatiguing in endeavoring to so balance the piece in marching that the hand may embrace the small of the stock and not the knob of the lock, the men will have a tendency to throw back their shoulders far enough to allow the barrel of the rifle to lean on the shoulder. The Carry arms has to be exercised hundreds upon hundreds of times before the men are able to move easily and naturally in that position. What a loss of precious time that could be devoted to more useful things. You may make use of the argument in opposition to doing away with the manual of arms, that it adds variety to the muscular exercises of the men and therefore tends to improve their bearing.

I should certainly be one of the last to consent to doing away with one atom of that rigid bearing which is such a striking feature in the Prussian Army. It is the very foundation stone of our superior discipline, and a material expression of obedience. I am thoroughly convinced that an equally good military bearing could be obtained by the *Gewehr-Uber* as we have now by the Carry, and I consider the time that could be economized in this way of so much importance that I think the experiment should be made of having one of two neighboring battalions situated in like condition drilled without the Carry arms. Should this battalion suffer the least bit in the rigidity of its bearing on this account I would abandon my idea.

For the same purpose of economizing time by doing away with things of no apparent utility, I would recommend cutting off the manual of the piece, the wheelings, and backward dress, except in companies. The drill-book already forbids the use of close columns in drilling a body of troops larger than a company. Would that this prohibition were extended to the manual of arms, the wheelings and backward dressing. Yet we not only see battalion commanders diligently drilling their whole battalions in the wheelings and manual of arms, which must be done because it is in the drill-book, but there are also brigade commanders who take great pride in having all six battalions of their command execute these movements in perfect time. Such a thing is not to be found in the drill-book, and yet it is often seen. The battalion and regimental commanders must practise these things with their commands very frequently in order that the rhythm may be maintained in the movements. I harbored a suspicion, however, that this sort of thing indicated that the brigade commander was a little weak in the upper story, and when I saw it done by a brigade commander of acknowledged ability, I asked him the troublesome question, "Wherefore all this?" And received for answer, "It is tradition, all brigade commanders do so." Much time is thus wasted.

Time is money; not only to the English merchant, but also in the Prussian Army. I think it is not overstating the case to say, that in drilling the battalion in the manual of arms, in the Carry arms, and in the duel formation in two and three ranks, we throw away six weeks in the course of a year, or at the very lowest calculation, from six to eight weeks in course of the three years' service. How profitably we could employ this time in field

exercises during the winter, while the fields are covered with snow, and the men can move across them without doing any damage; or in exercising the men without regular formation, in practice marches, or in any other good, practical, tactical work for which we do not now have sufficient time.

In closing permit me to invite attention to a slight oversight in our drill-book, that has forced itself upon my attention. There is no method prescribed for unloading the rifle. A rifle is frequently discharged in the process of unloading. If the command is at an Order Arms at the time, one of the neighboring men may be injured, because the rifle is very apt to be held inclined when being unloaded. If the men unload their rifles in the same position in which they load them, the front rank men are in danger. It is best to unload at *Gewehr-Uber* as I know by actual experience in the division entrusted to my command.

LETTERS ON ARTILLERY.

By PRINCE KRAFT ZU HOHENLOHE INGELFINGEN.

(From the *Abridgment of Capt. Toutée.*)

Translated by Major W. L. HASKIN, U. S. A.

VII.

WE know that it is but a short time since the artillery has acquired the right to march in the Prussian army abreast with the other arms.

Contrary to the custom in European armies, in France notably, the artillery has been considered in Prussia more as a learned corps than as a fighting arm. This was due to a certain spirit of pedantry which the examinations tended to give the officers of the corps. The form even of the works upon artillery, their size, and the titles of the chapters, presented a forbidding appearance, and made the *technique* of the arm appear to be a formidable sanctuary of which only the initiated could possess the key.

The word *technique*, thrown into a military conversation, inspired on all sides respect mingled with fear. And this cabalistic word occurred often, for the regulations took care to cultivate the prejudice which made of the employment of artillery a secret for the other arms. Every commandant of artillery who received an order from the general commandant was in effect required to protest if this order did not appear to him to conform to the principles admitted in his arm; and he should obey only after having explicitly thrown the responsibility upon the authority which gave him the order in question.

"I can recall a manœuvre in which I, as lieutenant, in command of two guns, was assigned a position which looked very fine in peace, but would have been very disadvantageous in war. I protested to the general com-

manding the advanced guard, who relieved me of all responsibility and agreed that I was entirely correct, but said that it was only a manœuvre, and that he simply desired two direction shots delivered quickly. Soon my superior—the artillery inspector—the celebrated General von Strotha came to me and inquired if I had protested in accordance with the regulations, and when I answered in the affirmative he said, 'That is fortunate for you, otherwise I should have put you in arrest.'

"The result of these principles was that indiscipline, uncontrol, the disposition to contradict or appeal, the raising of difficulties, were inculcated in the minds of the young artillery officers both theoretically and practically. The temptation, in justifying a young lieutenant in giving tactical lessons to an old staff officer of another arm, was too great to be resisted. Many a superior officer of the other arms of the Service, when he had ordered a beardless lieutenant of artillery to move to the right, received the answer that for technical reasons he preferred to go to the left. Then the superior might relieve him from all responsibility, but would not bother long in discussing the matter, and would end by saying, 'Do as you please, you understand the *technique* best, and ride off, thinking as Napoleon once said, '*Laissons faire, ces artilleurs, ce sont de mauvaises têtes.*' But no one can blame this old officer if in the future he preferred to have nothing to do with this arm, and did not attempt to apply it, but simply overlooked it. Therefore, when we see the artillery left without orders during the actions in the war of 1866, but left in the rear and entirely forgotten by the commanders, we can ascribe this condition of things in a great measure to this vicious system of instruction."

Even in 1866 it was seen that the exclusive spirit of this arm had been considerably weakened. Nevertheless, a certain uneasiness still made itself felt. Artillerymen frequently complained that a general had ordered their teams to go after bread. "The artillery is a fighting arm," say they, "and should not do the work of the supply corps."

On the other hand certain generals did not conceal their satisfaction at being able, on the field of battle, to do without auxiliaries so learned and so tenacious of their privileges.

But in 1870 the artillery resumed fully and definitely its accord with the other arms.

Even in the marches of concentration it applied itself to render all the services in its power. Lending teams, transporting haversacks, these are so many means of making itself felt as the "sister arm." Thus, before having fired a shot, it had already won all hearts, and at little expense, for during marches it is of all the arms the one which is least fatigued.

Each commandant of artillery became as a welcome presence to the commandant of the troops to which he was attached.

We know how much the service suffers when it is not thus. When one communicates only officially, the relations become strained, the commandant of artillery, who should march with the commandant of troops, is always tempted to find his presence necessary with his batteries. Besides, his presence is not required with the staff, and he absents himself oftener than he should.

If the presence of the enemy is signalled, the general will send for him, but when he has arrived the delay will have been an annoyance. It will be necessary to explain everything again for his benefit—the part to be taken by the artillery may have been badly conceived—certain dispositions already

ordered must be changed—in brief, harmony between a general and his commandant of artillery will cause a gain of at least half an hour in the appearance of the battery upon the line of battle.

When, after the marches of concentration the first encounters took place, the conduct of the batteries excited among all the generals a real enthusiasm. It was extorted from them.

The artillery, in acting as the devoted servant of the other arms, had caused the last vestige of distrust to disappear, and had itself lost all spirit of exclusiveness.

"I have, therefore, been all the more astonished since in seeing writers of ability and information advocate the doctrine that the artillery is technically independent, and must receive and establish such tactical independence. I do not believe that the persons using these high sounding expressions have crystallized their thoughts into any concrete form. That such a course would be injurious has been established.

"A general officer of infantry once said to me, after expressing his admiration and surprise over the heroic tenacity of his artillery, that he had remarked one peculiarity in the artillery in this war with which he had never credited it before—that it was now capable of carrying out actions entirely alone; '*gefechte ganz selbständig durchzuführen*;' but he could only have meant defensive actions against frontal attacks which are made over open ground completely swept by the guns."

The adoption of the rifled musket, whose trajectory is a very interesting subject of study, led the officers of infantry to look up their mathematics, mechanics, physics and chemistry, and contributed not a little to the near approach of these officers to their comrades of the artillery, from whom the science of ballistics had until now far removed them.

Finally, while it is necessary to acknowledge that the artillery have a more complicated service on account of the care of carriages and harness, and of its stable duties, it is true to-day that the three arms require of their officers an equal amount of higher instruction,

The studies of the fire of masses, of the dangerous zones, of the service of security, and of the service of the pioneers, have singularly enlarged the horizon of the infantry; and, in the cavalry the service of scouting alone demands from the youngest lieutenant the possession of the vast domains of tactics and strategy.

The studies of the officers of the three arms are, therefore, equivalent. Their duties are also equivalent, for all should, from morning till evening, and from the beginning of the year to the end, show themselves indefatigable in the accomplishment of their task. All are under obligations not only to hold fast what is already acquired, but also to make constant progress in technical as well as in general instruction.

Military Notes.

MILITARY CHANGES IN 1888.

LEUT.-COLONEL VOGT, the well-known author of *Die Europäischen Heere der Gegenwart*, has just published a supplement to this work, which summarizes very usefully the changes in armament and organization which these armies have undergone in 1888.

In Germany service in the Landwehr has been lengthened by six years. Five are passed in the first ban and six in the second, in which the men of the *Ersatz Reserve* are likewise incorporated after completing their twelve years. While in the second ban they are not subjected to drill or periodical musters, nor do they require permission to emigrate, provided due notice be given to the authorities. Service in the Landsturm is extended from the 42d to the 45th year of age, the force being divided like the Landwehr into two bans. In the first are included those liable to serve up to their 39th year; in the second, all who have passed that age. In peace they are not subject to any kind of control, but are to be properly armed and equipped, and liable to service in the army and navy in case of need. The first ban may be called to arms upon emergency by the general commanding a province, or the governor of a fortress, but the second can be summoned only by imperial decree. The writer considers that these arrangements will place an additional force of from 500,000 to 600,000 men at the disposal of the empire, and enable it to realize the programme of Prince Bismarck, *i. e.* to place a million defenders on either frontier, facing east and west.

The armament of the infantry with the magazine rifle has been completed. Experiments are in progress with a small calibre weapon, but as yet have led to no decisive results. The latter, more handy and deadly in effects, also allows of the soldier carrying fifty more cartridges on his person. Special bullets, consisting of a leaden core with a coating of harder metal, have been manufactured, which, though they will pass through two horses standing behind each other at 1000 yards, do not splinter bones, and thus cause mischief which has given rise to accusations of contravening the rules of civilized warfare. But the small-calibre arm requires a suitable powder which, say the Germans, has not yet been devised. It must be of slow combustion in order to lessen pressure, and almost smokeless to allow of the advantage of rapid fire being realized.

In the mounted branch, the Cuirassiers no longer wear the cuirass, but have been equipped with lances and carbines. It is proposed to arm the light regiments also with a shorter lance, and the Hussars of the Guard have already received them on trial. Opinions are divided as to the wis-

dom of this measure, the majority rejoicing in the long delayed triumph of *la reine des armes blanches*, while a few point out that with sabre, lance, and carbine the trooper will be overweighted; also that the time devoted to the difficult lance-exercise ought to be devoted to rifle practice. In future, epaulettes are to be worn only in review order and on festive occasions. Metal chains on helmets are replaced by leather straps, except in the Guards, who retain them for parade purposes, and black accoutrements have been substituted for white. Improved and lighter knapsacks and haversacks have been introduced, also a "divisible" (*zerlegbar*) tent, a section of which is carried by each individual, who can use it as a watch-cloak upon emergency. The chief use made of cyclists will be to communicate between the advanced works of a fortress, and experiments with balloons are being diligently pursued, chiefly directed, it would appear, at all events in the case of free balloons, to the possibility of bombarding a fortress from mid-air. Mr. Coxwell, however, solved this problem in a practical way years ago, though for reasons adduced in his book, he doubts its utility in warfare.

It is here stated that the present Emperor, perhaps in imitation of Peter the Great, who traversed every grade of military rank, has not yet promoted himself higher than brigadier-general, though by virtue of his imperial station he is "war-lord" (*Kriegsherr*) of the entire German Army.

In France, too, by the *loi organique* the period of military service has been prolonged, viz., from twenty to twenty-five years. Service with the colors, however, has been curtailed, against the better judgment of many experienced officers, from five years to three; six and a half more are passed in the reserve of the active army, six in the territorial army and nine and a half in its reserve.

It is interesting to learn that the Governor of Paris, General de Saussier, is Commander-in-Chief designated in case of war, and that Generals De Miribel, Wolff, Billot, Février, Lewal, Carray de Bellemare, and the Marquis de Gallifet, would be his chief coadjutors.

Twelve battalions of Chasseurs armed and equipped for mountain warfare, have been opposed on the south-eastern border to the Italian Alpini.

The French cavalry is to be raised from 83 regiments to 91; viz., 12 of cuirassiers, 30 of dragoons, 21 of chasseurs, 18 of hussars, 6 of chasseurs d'Afrique and four of spahis. Each is to consist of five squadrons, mustering together a strength of 37 officers, 792 men and 722 horses. Two regiments of dragoons and six of hussars have not yet been raised. Special attention is henceforward to be devoted to equitation in the French cavalry. It may be mentioned, as a fact worthy of imitation, that the French railway corps learn their work practically in time of peace, the line Orleans-Chartres having been declared a "military railway," on which soldiers work in combination with the civilian staff. By this time, it is supposed, not only the regulars but the territorials are provided with the Lebel rifle, but serious doubts are expressed in German military circles with regard to the success in practice of Colonel Bruyère's smokeless gunpowder.

In Austria-Hungary several measures have been adopted to strengthen the armed forces arrayed for the defense of the monarchy. Allowance is

now to be made for casualties in levying the yearly contingent of recruits—a precaution which has not hitherto been observed. The Landwehrs of the Dual State have been in great part made available for the reinforcement of the Field Army, even when acting on foreign territory; while the duties of home defense, which were hitherto incumbent on them, now devolve on the Landsturm. The first ban of even this force may now be called on to fill casualties in the field, in which case the second ban take up the garrison duties at home; and, as the strength of the first ban is estimated at no less than 516,000 men, the Austro-Hungarian army now shows, on paper, the respectable total of 1,906,172 men—a figure which the writer looks upon as far too low, judged by the German standard.

On the 1st of October last the Bosniak infantry, which has been organized with so much care and discrimination on the part of the authorities, was augmented by four companies. These troops are said to yield, in drill, general smartness of appearance and discipline, to no others in Europe. They are equipped in light blue tunics and pantaloons, and black accoutrements, but retain the Turkish fez. Composed of the most diverse nationalities, Greeks, Roman Catholics and Mahometans are found in their ranks, all held together by the common bond of Austrian discipline. Here in Bosnia we may see Austria executing on a small scale the task which has fallen to her lot in history, and which gave birth to the expression that were that monarchy not in existence it would be necessary to invent it: we mean the gradual and laborious welding together of the heterogeneous races which populate the southeast of Europe. Much caution was used in forming troops out of this touchy material. No more than 1200 men were raised in the first instance, half only being retained with the colors. These were distributed into four companies, stationed at Serajevo, Banialuka, Dolnia Tuzla and Mostar respectively. They were by degrees reinforced till they ranked as battalions, each of which in October last numbered seven companies apiece. Next year it is intended to double the number of battalions, and eventually increase them to twelve, when a Bosnian division will be probably created. It is even proposed to call a Landwehr on the Austrian model into existence. A Mannlicher rifle of smaller caliber than that previously in use is being supplied to the Austrians, and at least five Army Corps are already armed with it. The field artillery has been augmented by five divisions, mustering 120 guns, in order to furnish batteries for the landwehr infantry division.

In the section devoted to Russia, we are told that the work of pushing troops in large masses westward is still in progress. It is stated that the military district, Kharkoff, and the two Caucasian army corps have been broken up in consequence, the troops which belonged to them having been distributed throughout the districts of Warsaw, Odessa and Kieff. The contingent of recruits for 1888-89 was fixed at 250,000 men. Their training, however, takes much longer than elsewhere, because during winter no drill takes place except indoors. A common idea exists that the Russian soldier endures extreme cold better than others, owing to the severity of his native climate. That this is an error those would suspect who have watched the sufferings of Russian visitors here in "bleak De-

cember." The Russian soldier gets too much "coddling." In the height of summer only is he exposed to the caprices of weather; and even then he has to put on his great-coat when the thermometer dips below 50° Fahrenheit! The Germans in France stood the cold better than the Muscovites in Roumelia; but they were better fed, and it stands to reason that a good commissariat never tells with greater effect than in times when the human frame, exposed to severe cold, has to maintain its temperature without much external assistance. Frost bites were rare in 1870-71 among the invaders of France; while in 1877 a regiment from the north of Russia lost 800 men in fourteen days from that cause alone. This subject is important enough to justify a quotation:—

"It is the custom to say that the cold of 1812 was Russia's best ally against the French; but this is not quite correct, for Napoleon unaccountably chose to retreat by the same way that he advanced, through a devastated and exhausted country."

Here we pause to reflect that Napoleon in reality tried hard to effect his retreat by a new line, but that his intentions were frustrated by the battle of Malo-Yaroslavetz.

"The fugitives were prostrated by hunger, and, of course, froze to death; but the true cause was lack of nourishment. The Russians, during a rapid pursuit through districts drained of their resources, likewise suffered frightfully from famine, lost enormous numbers, and, prostrated by hunger, froze to death as fast as the French. Nowhere else are such precautions taken against the effects of cold, both in the matter of dress and of household arrangements, as in Russia. Deprived of these accessories, transferred from the warm apartment he is used to and forced to bivouac in the snow (especially if his long thick sheepskin be not at hand), the Russian suffers much more from the cold than other soldiers who have not been so pampered in this respect."

The drunkenness which prevails to an increasing extent in the ranks of the Russian Army must likewise tend to enervate the men's constitutions. Ever since the abolition of serfdom this vice has been assuming gigantic proportions, which seem beyond what is possible for human resolution to combat. Children are to be seen intoxicated in the streets, and the physique and moral qualities of the population are, we are assured, rapidly degenerating from this all-pervading vice. In 1887 the peace effectives of the Russian Army numbered 31,196 officers, and 840,568 men; but in this estimate the Finland Army, 176 officers and 4,688 men, and the customs' officials, 23,659, were not included. At the same date, the Cossacks under arms counted 2,242 officers and 48,277 men in their ranks. There are thirty-two different nationalities in the Army.

With regard to Great Britain, Colonel Vogt expresses serious doubts whether that "hybrid" force, the mounted infantry, will prove efficacious in War; and these doubts would be well founded were they applied to the conditions under which the German or French armies are likely to serve. There is a certain "malicious glee" (*schadenfreude*, let us style it) in his criticism on the results attained by our naval manœuvres of last year and 1887. "The English," he exclaims "can no more talk of the vaunted in-

vulnerability of their coasts;" but he plainly exaggerates the extent of the success obtained by Admiral Fremantle; and as for the imaginary ravages committed on our coast by the enemy a twelvemonth ago, they would hardly be attempted for fear of reprisals, at any rate on an extensive scale. However, the conclusions he draws from these experiments are correct enough, viz., a blockading fleet must nowadays be double the strength of the blockaded vessels, and the effective defense of an extended line of coast must be sought in adoption of a vigorous offensive plan of action.

In Italy, the field artillery has been increased and reorganized. It now consists of twenty-four regiments of eight batteries apiece. Each army corps has attached to it two of these regiments; half of the one being posted to each infantry division, and the other regiment constituting the corps artillery. In war time each battery numbers six pieces, but in peace no more than four of these are horsed, and cadres for formation of ammunition columns are assigned to each regiment. One horse artillery regiment of six batteries, and another of mountain guns containing nine batteries, complete the Italian establishment, which in Peace time amounts to 793 horsed guns, and in War expands to 1188.

A special corps for Africa was likewise created in 1887 which, incorporated into the standing army, may now be regarded as permanent. It consists of two brigades, each of two regiments of three battalions, a squadron of Light Horse, four batteries, a company of engineers, a sanitary company, and one for purposes of supply. Their total muster is 238 officers, and 4762 rank and file.—*London Illustrated Naval and Military Magazine*.

THE TACTICS OF COAST DEFENSE.

In a recent interesting lecture at the Royal United Service Institution, Lieut.-Colonel N. L. Walford, R. A., remarked:—The tactics of coast defense have, I believe, never been brought forward in any distinct form, and I have failed until recently to find any works on the subject either in our own or in foreign languages. I hope, however, to be able to convince you, not only that this study is the natural outcome of our continued advance in *matériel* and in training, but also that it is well worthy of careful investigation, since on an intelligent comprehension of its principles will depend the construction and handling of the various works and engines of defense which we are, at great cost, accumulating in all parts of the world.

It is universally acknowledged that field tactics form an integral portion of the Art of War, teaching as they do the system of the employment of men and weapons in actual battle; the tactics of siege operations are also, by common consent, allowed to be worthy of study. Why, then, should anyone deny that coast defense, which also has its peculiar form of combat, should alone be incapable of inspiring a peculiar system of tactics? This denial is based, I believe, on two causes: 1. A conviction that tactics imply movement. 2. The fact that coast tactics require for their comprehension some knowledge of another branch of our forces—viz., of the navy.

It is probable that in future the artillery armament of a fortress will be divided into three parts, and that the design and mode of construction of the cover for each of these three fractions will differ essentially from those

of that intended for the others. The site of this cover will also vary for each.

1. *The Heavy and Medium Guns intended for Direct Fire on the Enemy's Battle-ships.*—These guns will, wherever possible, be posted (the medium guns in batteries, the larger in separate emplacements) as high above the level of the sea as may be compatible with the power of commanding all water in their front which is of sufficient depth to allow of the passage of a battle-ship. The works designed to contain them form, as it were, the *enceinte* of the sea-front of the fortress, and it is upon their action, in the case of a systematic attack, that the ultimate success or failure of the defense depends.

It is most important that they should, as far as possible, be concealed from the enemy, or should be rendered to some extent invisible, either by the nature of the background, by the choice of site, or by their own color and form; but, nevertheless, no portion of their offensive power should be sacrificed to the desire to obtain immunity from fire. These batteries are the true fighting-line, and must be prepared, both by construction and by armament, to resist a heavy and even a concentrated fire from the enemy. Great care will, above all, be needed in deciding upon the number, size, and position of their magazines.

Each of these forts or batteries should in action be an independent command, forming, as it were, a unit of the defense; and the conduct of the action in each individual work should be rendered easy by an organization, and a system of command carefully laid down and practised during peace.

Either in or near each battery or fort a station must be provided for the commander and for such apparatus as he may need for conducting the fire, whether this be a position-finder or a range-finder; this station should be rendered at least moderately secure from the fire of the enemy, either by concealment or by the construction of cover. It is evident that it should, when possible, be outside of the fort, both with the above object and, also, because otherwise the view of the commander will in many instances be interrupted by the smoke of the guns. It is further urgently necessary that the commander shall be supplied by some means of communicating instantaneously with each and all of the guns or sections of his command; without such communication the systematic conduct of fire is impossible.

II. *The Guns or Howitzers which are intended for High-angle Fire.*—The positions for such guns may be selected within large limits, as it is not only unnecessary, but is in some cases even undesirable, that the enemy shall be visible from their site; they may thus be placed at any convenient spot which will enable them to make good use of their length of range. It will not in many cases (especially when the character of their position will permit their smoke to be invisible to the enemy), be necessary to construct any form of parapet in front of them, but it will be often most desirable to arrange for any necessary change of position by means of a tramway, the mountings being fitted with removable axles.

The object of their use is two-fold, viz.: to prevent the enemy from anchoring within their range, and to keep down the long-range bombarding fire of the attack; in each case they act by high-angle fire directed against

the decks of the enemy's ships. There are two essentials to the efficiency of their action: an ample supply of ammunition, and a considerable number of guns. Though the high-angle fire of heavy howitzers has been found in practice to be exceedingly accurate in still weather, yet its efficiency must evidently suffer from many disturbing causes, owing to the low muzzle velocity of the shell. It is further necessary that its action shall partake somewhat of the nature of a surprise, for an enemy's ship which has received a bouquet of shell around her berth will probably move away as quickly as possible, and thus another sighting shot may not be possible; again even with our improved system of directing fire, the effect of high-angle fire on a moving target cannot, if only on account of the time of flight, be confidently calculated upon. It is, therefore, necessary to make up for the comparative uncertainty of high-angle fire by the expenditure of a larger amount of ammunition.

It is absolutely necessary for the efficiency of these howitzers that steps shall be taken to ensure the most accurate observation of their fire, and for this purpose an observing station must be selected such that, while it is not conspicuous to the enemy, it may enable the fire of the guns to be easily watched; one station will be sufficient for a large number of guns, provided that it be supplied with means of immediate communication with every possible position of the guns. It may frequently be of advantage to use these guns by night for the purpose of annoying the enemy, or of driving him from his anchorage; in this case the range and bearing of the ships will generally be obtained by day.

It will be observed that, by the nature of their positions and to some extent of their armament, these guns will not be able to defend their front, and care must be taken that neither they nor indeed any of the advanced batteries are left undefended against the attacks of landing parties.

III. *The Light Armament.*—This will include:—1. The movable armament; and 2. The armament intended for the defense of mine-fields and other obstacles.

Of the former I propose to say very little; it will generally be composed of field-guns, and will be used to aid in repulsing the attack of landing parties and also to assist in the defense of obstacles. It will further be probably employed on the land front of large fortresses.

The armament intended for the defense of mine-fields consists, I understand, principally of quick-firing guns; it will be well to consider the conditions under which these will be called upon to fight.

We may, I presume, assume that operations against mine-fields will rarely be attempted except by night, and that for preference a dark night will be selected, while every means will be taken to conceal and to cover the boats engaged in the work of destruction.

It appears, therefore, that these guns will have to fire on a small target, which will be moving with great rapidity, and of which all view will as far as practicable be denied to them. These are conditions of peculiar difficulty, and can be met only by adequate training and previous preparation. In theory it is, I presume, intended that the number of projectiles fired shall in some degree make up for the probable inaccuracy of the majority of

them, and thus quick-firing guns are selected; but I may perhaps be pardoned if I add that I do not feel convinced that quick-firing guns are the best possible weapons for the defense of mine-fields.

But we have now only to consider how the fire of such guns can be made effective under the most unfavorable circumstances. In the first place we must, I think, lay down that their emplacements should be permanent, though the guns themselves need not be placed in position until they are required. Each emplacement, or mounting, should moreover be provided with some means of giving the necessary elevation without looking over the sights, and also with the means of giving the requisite training to each gun by some form of graduated arc. In addition to this, each emplacement should be provided with a plan of the mine-fields, showing the ranges and bearings of the various portions. It may by these means be possible to bring the effective fire to bear upon a totally invisible target, since the guns can thus be laid on any desired section, though the target be invisible.

I shall here be probably reminded of the existence of the electric light, but I would ask those of you who have seen it in action whether they have also observed the effect of—(1) The smoke of our own guns; (2) the smoke of the enemy's guns with the wind blowing on shore; and (3) rays of light thrown by the enemy's ships either across our ray or directly on the guns. With regard to this last I am prepared to own that by so doing the enemy will enable us to lay our guns on his light; but to do so would answer his purpose and divert our fire from its principal object, the defense of the mine-fields. Be this as it may, it is wiser to be prepared for the worst possible conditions, and to arrange that the power of vision, which may be out of the question, is not necessary.

Two other points yet remain for notice. First, it is desirable that the emplacements for the quick-firing gun shall be distinct, and even separate, from those of the main armament, both in order that they may not suffer from the fire directed on the latter, and also that they may be as far as possible rendered indistinguishable from the ships. They must, however, be at the same time so placed or so covered that they will not be liable to attack by landing-parties, for such an attack would, under many circumstances, be the best possible way of attracting the attention of the defense from operations against mine-fields. Secondly, it is absolutely necessary that some system of communication shall be arranged between—1. the guard-boats and the quick-firing batteries; and 2. between the observation parties of the submarine mines and the guard-boats; for otherwise the presence of the latter may either paralyze that of the other two fractions, or they may, on the other hand, suffer by their premature action.

We are all acquainted with the use of the electric light, and I need not dwell on the advantage of being able to some extent to turn night into day by employing it for illuminating mine-fields and targets of all kinds. But there are some difficulties connected with it on which a few words must be said.

The employment of the electric light is perfectly simple so long as it is a question, as it has generally been with us, of one gun, (or one group of guns) and one light; but we shall find the question very much more com-

plicated if we endeavor to work out a system for the combination of the action of several forts and several lights.

I am inclined to think, on consideration, that the only plan to avoid confusion is to allow a light to each unit, and to place it under the command of the commander of that unit. Nothing but confusion can result from the unconcerted employment of several lights by independent observers, who work neither in combination with each other or with the guns, and are not connected with any other portion of the defense by any means of communication quicker than an orderly. I, therefore, venture to offer the following suggestions :—

1. Each fort or battery should be provided with a light.
2. This light should not be posted in the battery, but at some distance to one flank; both in order that it may not be struck by shells aimed at the battery, or point out the position of the latter, and also because the beam of light itself is a disadvantage to anyone standing in rear of it.
3. Wherever it may be, it must be under the orders of the officer commanding the unit to which it belongs, and its movements must be directed by him alone; thus only can it be correctly used in real conjunction with the guns.
4. There must be electrical communication between this officer and the light. There would, I believe, be no difficulty, electrically speaking, in making an arrangement such that the light should be automatically moved, so as to throw a beam on any spot upon which the telescope of the commanding officer might be directed; but this would, of course, cost money.
5. It would probably be found convenient in practice to make a rule that no fort which is not engaged should show its light.

As time goes by, and the use of the electric light becomes more general, it may be perfectly easy to provide a light for each fort, but this we cannot hope for at present. Such lights as we have should, therefore, I suggest, be especially told off to those batteries which are intended to defend the mine-fields.—*United Service Gazette*.

THE HORSE ARTILLERY BATTERIES OF CAVALRY DIVISIONS IN THE RUSSIAN ARMY.

According to the *Russki Invalid*, the Cavalry Division has two batteries which are not specially attached to brigades, but remain at the immediate disposal of the divisional commander. There is no commander of the Divisional Artillery; each battery forms a special corps belonging neither to a regiment of artillery, as is the case with us, nor to a brigade, as is the case with the mounted batteries attached to the Russian Infantry Divisions. The battery is commanded by a colonel or a lieutenant-colonel; it consists of six guns, with an establishment in time of Peace of five officers, 102 riding-horses, and fifty-three draught-horses. It would doubtless be necessary to commence a campaign with this establishment, without being able to wait for requisitioned horses. The gun is made of steel, and has a calibre of 86.9 millimetres, those made at Oboukhow weighing 360 kilogrammes. To strengthen the gun-carriage without destroying its lightness

it is fitted with an india-rubber buffer, which deadens the shock of the recoil (Engelhardt system). The gun and wagons (on a war footing) are drawn by six horses. The battery on a war footing consists of six guns and nine wagons; each gun-limber carries twenty projectiles, each wagon fifty-five. Collar harness is used; the traces of the lead horses are attached to the traces of the centre horses, which are in turn fastened to the swingle-tree at the end of the pole. The leaders are brought very close to the centre horses, but the latter are some distance from the wheelers, who are themselves harnessed up very long. The object of what appears to us an excessive length of draft is to facilitate the passage of obstacles. The harness of the batteries of the Guard is excellent, but in the Cossack batteries and batteries of the Line it is very rough; it is said, however, to be very strong. The batteries manœuvre at an extended pace, the drivers wheeling about at full gallop on the arc of a circle of a few paces radius, in order to bring their guns into action in the direction in which it is desired to open fire. The usual formation for manœuvring is "column of divisions in rear of the centre." Besides the No. 1 of the gun and the three drivers, there is a detachment of nine gunners, who may, in certain cases, to diminish the length of the column, march either on the right or the left of the gun, as with us, instead of following in two ranks in the rear. When the division is marching to the front in column of route, the artillery is placed near the head of the column, both batteries together and interposed between the first and second regiments. In certain circumstances one battery only is to be placed, the second marching between the two brigades. In a retirement the two batteries precede the last regiment. In mass formations the batteries are forty paces in rear of the last brigade. When, however, the fighting formation is adopted, the artillery takes up a position several hundred yards to the front of, and on one of the flanks of the first line. Often, however—on account of the ground—the artillery remains in the centre, whilst the rest move off to one of the flanks. Before the commencement of an engagement the divisional commander indicates to the artillery—1. The position which it is to occupy. 2. The principal objects on which its fire is to be directed. 3. How it is proposed to employ the cavalry. It is then left to the battery commanders to choose the exact positions for their batteries, the nature of fire to be employed, and, in a general way, their mode of action. The *spécialité* of the Russian artillery is the rapidity with which the commanders select good positions for their batteries, and so insure the maximum effect for their fire; but it was difficult to ascertain whether the scene of the manœuvres had been specially chosen with a view to utilizing the artillery positions, also, if the positions taken up by the batteries were the result of a rapid glance-round of their commanders, or were merely selected from a knowledge or previous study of the ground. In every case there appeared to be perfect accord between the two arms; in fact, the squadrons and batteries seemed to form but one whole, a result which may, perhaps, be attributed on the one hand to the two arms having been accustomed to manœuvre together during the two months of their annual stay in camp, and, on the other hand, to the fact that commanders of batteries become colonels and then generals of cav-

alry. Thus the officers commanding the 5th and 14th Cavalry Divisions have both commanded batteries of horse-artillery.

THE NAILLESS HORSESHOE.

The nailless horseshoe, which has not stood the test of a two year's experiment under every sort of condition, and has been tried at Woolwich with transport horses, is an invention of considerable interest to soldiers. For the benefit of those who have not seen the shoe at the Royal United Service Institution, we give the following brief description of it: The shoe is attached by a steel band which passes below the coronet from one extremity of the heel to the other. This bar is kept in position by a steel pillar which runs from the centre of the shoe up to the centre of the hoof. In addition there are three short studs—one in the centre of the shoe, the others near the heel and on each side of it. It can be put on by any one who has once seen the process, which takes about half the time required with the cold-shoe system, which latter is an improvement as regards time on the ordinary process with nails. The nailless shoe diminishes or puts an end to cutting, and is particularly suited to brittle hoofs or hoofs with sand cracks. It costs as little, weighs as little, and lasts as long as the ordinary shoe; and, moreover, is not sucked off on heavy ground. The advantage of such a shoe in the field in the case of a convoy, and especially in that of a cavalry patrol, where a minute's delay in replacing a cast shoe may mean capture, is obvious. We commend this invention, which has not passed out of the experimental stage, to the attention of Dr. Fleming, the Principal Veterinary Surgeon of the Army.—*London Army and Navy Gazette.*

Comment and Criticism.

I.

"Mounted Infantry—Its Present and Its Future."*

Brevet-Major-Gen. Wesley Merritt, Brigadier-General, U.S.A.†

THE lecturer in my opinion does well to disclaim an intention to usurp with mounted infantry the service of cavalry. The horses are to be used only as a means of rapid locomotion. No one can doubt the advantage in War of rapid movements of large bodies of soldiers, and the question raised by the lecturer reduces itself to the method of accomplishing this. If wagons drawn by mules, or horses, will accomplish the same work as expeditiously and more economically why mount the infantry on horses? A force of this kind would be most expensive—would never become cavalry and might degenerate into very poor infantry. Besides, two animals will transport in wagons six or more men with their arms and equipments—a great gain over what they will carry. Also men and wagons can be used elsewhere when the exigency, which at best can only be temporary, and which, even in a long war may occur infrequently, for the use of mounted infantry has passed.

It is time that our English cousins were becoming enlightened as to the mounted forces, during the Civil War in this country. We can readily forgive the distinguished essayist on military subjects, Colonel Maurice, who, when writing for an Encyclopedia, dismisses our "so called cavalry" as being of the character of "infantry" in carts or on "bicycles or tricycles," but Major Hutton who studies the subject with a view to drawing useful lessons, should not endorse this view nor be guilty of the error of referring in a single paragraph to "American cavalry leaders, such as Morgan, Forrest, Grierson, Stuart and Sheridan," and in that order. Morgan never was, nor did he claim to be, a "cavalry leader." His troops were irregulars, "mounted infantry" for want of a better name, and prospered only so long as they did not come in contact with an efficient enemy.

Forrest was a natural leader of men, but was deficient in education, either as a soldier or a man. Any force under such a leader would naturally deteriorate and become demoralized under adverse conditions. Sheridan and Stuart were born cavalry leaders, improved by education, as were also Philip St. George Cooke and Buford. The cavalry under them and their subordinate officers, was as good as long service, battle experience, drill, discipline and hard work could make of the best material for cavalry the world has ever produced.

It did not succumb as did the cavalry of Napoleon, according to Major Hutton, to the allurements of "the more dashing and adventurous rôle of cavalry" to the neglect of opportunities for using the carbine, but continued to the end of the War fit for the emergencies of battle either mounted or on foot.

* See article by Major Hutton, *King's Royal Rifles*, JOURNAL M. S. I. (July).

† Major-General U. S. V., Commanding Cavalry Corps, Army of the Potomac, 1865.

I have neither the time nor the disposition to discuss at length this matter, but will venture the remark that British officers have studied the history of the Civil War to poor purpose if they conclude that any nation will overcome an enemy in a future war by mounting regiments of infantry on horses, with a view to having them perform the service of the "so-called American cavalry." These same officers, from the best informed to those more ignorant, have never been able to distinguish between the romances written by Heros von Borcke and the early chronicles of Morgan's adventures, and the true history of the cavalry in the War.

Major Hutton quotes (p. 342, JOURNAL MIL. SERV. INS.) from "an able English writer" as follows: "In acting dismounted, care must be taken that the cavalry does not become mere mounted infantry, which is the last thing to be desired. All that is demanded from it is limited to its being able, when occasion may require it, to render such services. It is no part of its duty to undertake or to be drawn into long sustained combats, or attempt, when dismounted, to cope for any length of time with the enemy's infantry."

A very sensible statement of facts plainly deduced from the experience of the War of the Rebellion in this country, and not deducible from any experience anywhere else. The same conclusions are reached and elaborated in a late publication by Captain St. Chapelle, on the tendencies of the Russian cavalry.

Americans may pride themselves on having learned a lesson and practised its principles twenty-five years since, which the nations of the old world have not learned yet. Why harp on the cavalry of Frederick the Great and Napoleon, when the conditions for its service have been so essentially changed? If it is any consolation to the English that their cavalry at Balaklava was not "so-called cavalry," they are welcome to all the glory that fact carries with it. Wise men will conclude in time that the duty done by the French cavalry at Woerth, or the German cavalry at Mars la Tour, scarcely compensated for the difference of name—better be "so-called cavalry," alive and ready for future emergencies, than the shattered fragments which illustrate the Frenchman's remark, "It is grand, but it is not war."

The lessons that we learned and enforced in the Civil War were, briefly:

1st. The cavalry should be as perfect for all its duties as skill, energy and constant application, coupled with war experience, will make it.

2d. If any organization does not reach the standard, but insists on being "mounted infantry," dismount it.

3d. Use the cavalry with judgment, fighting without hesitation on foot when necessary, but always remembering that at some time in every battle cavalry can be used mounted with good effect, either in assisting in a victory or in mitigating the disasters of a defeat.

Each one of these lessons was impressed by more than one instance in our War, and the Russian army seems to be profiting by our experiences.

Brevet Major-Gen. James H. Wilson, U. S. A.*

I have read with much interest the paper by Major Hutton on Mounted Infantry, and also its discussion by other officers of the English army.

Having been out of service for nearly twenty years, I am reluctant to take part in a technical discussion, and yet I cannot let the occasion go by without a few suggestions and comments. I have read several other papers of a similar kind, and am struck by the anxiety displayed by all, or nearly all, foreign military men, that the organization, characteristics and use of mounted infantry should not be confounded or

* Major-General U. S. V., Commanding Cavalry Corps, Military Division, Mississippi, 1865.

permitted to interfere with those of the cavalry. Nearly all European writers seem to think that there is some essential difference between the two, and, certainly, no one can read the discussions of the subject without perceiving that European cavalry officers, with hardly an exception, are primarily opposed to the organization of mounted infantry.

Admitting at once the marked difference between the *terrain* in respect to roads, bridges, fields and forests in European countries as compared with America, and that all military operations can be conducted with much more precision and regularity in the former than in the latter, I still maintain that in future wars there is or should be no essential difference in the organization and uses of mounted troops, whether they are called cavalry, dragoons or mounted infantry. There are certain differences in armament which are more important than any differences of functions; but just to the extent that firearms are dispensed with, the uses of mounted troops will become limited and their efficiency impaired. Lancers are or should be entirely obsolete. I venture to say that there is not a regiment of lancers in the world that could maintain itself against a good regiment of American cavalry or mounted infantry of equal strength. The latter would surely drive the former from the field without the slightest difficulty, and it would, with but little more difficulty, do the same to a cavalry regiment armed only with the sabre.

I regard the difference of real function of the various kinds of mounted troops in actual warfare as largely imaginary and fanciful. No matter what they are called, they all have to come down to about the same kind of work in the rough and tumble of an active campaign. In the words of Forrest, "War means fight and fight means kill"—so that, after all, war consists principally of marching and fighting. Everything else is accessory and incidental.

I shall not go into the details of armament and equipment, but I hold it as essential that all mounted troops should be armed with magazine carbines or rifles, whether they have sabres and pistols or do not have them; and I am sure our experience shows that the best men and officers, whether organized as cavalry or infantry, will with proper care make the best mounted troops. I am also sure that the best mounted troops, all other things being equal, are those which have the best horses and take the best care of them.

In other words, the best soldier, plus the best horse, is better than the best soldier without the horse. All suggestions, therefore, of mounting infantry on ponies, inferior horses or in wagons, are simply suggestions to take something less efficient than the best, and in actual warfare will bring more or less discredit on the nation adopting them.

The principal use of the horse in cavalry or mounted infantry, is to transport the soldier rapidly and with the minimum of fatigue, to a position from which he can assail the enemy or operate upon his communications or against his detachments with advantage, namely, to his flanks and rear. If it does this under circumstances and conditions favorable to a mounted attack, a mounted attack should be made, and of course a part of the troops should be armed and equipped for just such emergencies, but the arms for this purpose should be attached to the horse or saddle rather than to the soldier.

The universal adoption of long range, rapid firing, small arms, and machine-guns, will, necessarily, increase the danger of front attacks, and make long and rapid marches all the more necessary hereafter. Open field fighting and the parallel order of battle, must become more and more destructive and less and less frequent, and by the same steps attacks on the flanks, rear, and communications, of the enemy should become so frequent as to characterize the warfare of the future. The troops that can march the farthest and the most rapidly, will prevail. So that the best strategy, as well as the best

organization and the best instruction, will become more and more the object of every nation going to war.

It is obvious that mounted troops are harder to discipline, to keep in order, and to handle with efficiency than foot soldiers; hence the best officers and the best men as well as the best horses should be put into that service. It may be confidently asserted that that army which is first organized in accordance with this principle, and includes within its numbers the largest proportion of mounted troops—I see no reason why they should not all be called cavalry—will in the long run conduct war most successfully.

The ideal proportion of mounted to dismounted troops for an army in the field would be from one-third to one-half, and if horses could be found in such numbers, I see no reason why they could not be supported in any civilized country rich in grain and forage. Of course they would have to live mostly off of the enemy's country, but that would be a return to primitive methods not altogether inconsistent with military success. As a rule, mounted troops should be massed and handled in large bodies in order to accomplish great results, but neither the regiments, brigades, nor divisions should be too large. Six thousand men are the maximum number for a division, and from fifteen to eighteen thousand for a *corps d'armée*. But few mounted men should be detached for picketing or scouting in front of the infantry. A squadron can perform such duty in many cases as well as a regiment or brigade, and there is no work which is more demoralizing or destructive to the discipline and the general efficiency of the troops performing it. It is injurious to both the cavalry and the infantry, wearing out the horses of the one, and begetting a feeling of carelessness and dependence in the other. Generally, each should be required to look out for the enemy in its own front, and this is especially a good rule when the hostile armies are within striking distance of each other.

Finally, cavalry should not be overworked. The horses, however good, require constant and intelligent care. Even with the lightest equipment and arms they have heavy loads to carry, and while they can do it under favorable circumstances for many days at a time, covering two to three times the distances, daily, possible to infantry, they can do it all the better, when they start fresh and in good condition. The wise commander will therefore hold his cavalry as much in reserve as possible, looking carefully after everything which can promote its efficiency, and taking care not to call upon it for trivial or unimportant service, so that when a suitable opportunity comes for it to act, it can act with greatest possible endurance, power and effect.

With mounted troops properly equipped, armed and commanded everything is possible which is possible to infantry, and many things which no infantry could possibly hope to accomplish. Hence, that army which in the next great European war has a marked preponderance of mounted troops, handles them wisely, and commits no great strategic or administrative blunder, may confidently count upon victory.

WILMINGTON, DEL., July 2, 1889.

Lieut.-General Wade Hampton, (late) C. S. A.*

I have read with great interest Major Hutton's Lecture on Mounted Infantry, and I concur fully with the views he expresses as to the importance of this new arm of the Service. Indeed, I have no doubt that the employment of Mounted Infantry, on a large scale, will be recognized as an imperative necessity should war occur in the future between strong, civilized peoples. While concurring with the general scope of Major Hutton's able argument in favor of Mounted Infantry, I do not agree with the plan he suggests, if I understand him correctly, for the organization of such a force. He professes to have a comparatively small force, made up of details from different regiments, to be used only when occasion requires; the component parts of this organiza-

* Commanding Cavalry, Army Northern Virginia, 1864. U. S. Senator from South Carolina.

tion to return to their respective regiments when their services are no longer needed. No small organization of this character would be of practical value in the field, and to make the services of mounted infantry available in War, the force comprising it should be strong enough to act independently, or rather in conjunction with cavalry proper. As I suppose that it is desired by the JOURNAL to obtain the views of those officers who have had some experience in cavalry operations in the field, I can best meet this wish by suggesting what would, in my opinion, be the best organization for a force of mounted infantry. Of course the strength of any such body would depend on that of the army to which it is attached, and the magnitude of the field of operations in which it is expected to be engaged; but for the purpose of illustration I shall take a brigade, the smallest organization, which I should recommend, though when great armies are opposed to each other, a division, or even an army corps of three or four divisions, might be usefully employed.

Taking the brigade then as the unit, I would have it composed of four regiments of mounted infantry, one regiment of cavalry, each 600 strong, and one battery of four guns. The infantry should be armed with repeating rifles, of small calibre and long range, and with pistols. The cavalry should have sabres and pistols only, and should be expected to act only mounted. The equipments should be as light as possible, so that the force could move rapidly. On the crupper of each saddle there should be attached a ring, and to the bridle of each horse a strap with spring catch. Instead of detailing one man to hold three horses, as is the present system when cavalry fight dismounted, I should have seven horses hitched, one behind the other, the leading one to the crupper of a mounted man. Thus seven-eighths of the men could be engaged on foot instead of three-quarters, as has been the custom. I am not sure but that one man could manage nine led horses by the plan proposed. The cavalry could always protect the flanks of the brigade, cover its advance or retreat, and charge the enemy when an opportunity presents itself. Another new feature in the armament of cavalry could, in my judgment, be adopted with signal advantage, and that is the use of repeating shot-guns, the shells loaded with buckshot. A regiment having half of the men armed with sabres and pistols, the others having shot-guns and pistols, would be more than a match for any two regiments armed in the usual manner. The letter asking my views on Major Hutton's Lecture came at so late a date that I have only had time to make a few crude suggestions on the subject discussed. Quite a large experience in cavalry operations, and much thought on this topic, have formed the convictions expressed in the hurried notes now sent; and these are at the service of the JOURNAL if they possess any value.

Major-General Matthew C. Butler, (late) C. S. A.*

The JOURNAL containing the lecture of Major Hutton of the British Army, on the subject of "Mounted Infantry," was duly received, and I have read the paper with much interest.

It does not seem to me that the plan he suggests of providing a corps of mounted infantry is practicable. Without stopping to point out my objections, I may as well say now, that in my judgment, *all* cavalry in the future, all mounted troops, ought to be mounted infantry, that is to say, all mounted troops ought to be armed with long-range guns, carbines or rifles, and with little else, and be prepared to do most of the fighting on foot. In my four years experience as a cavalry officer, as a company, battalion, regimental, brigade and division commander, participating in most of the operations

* Formerly Commanding Cavalry Division, Army Northern Virginia, Now U. S. Senator from South Carolina.

of Gen. Lee's army of Northern Virginia, and from January, 1865, to the surrender in May, with Gen. J. E. Johnston, I rarely had occasion to use either the sabre or pistol.

If I were, therefore, called upon to equip a mounted command for effective service—company, regiment, brigade, division or corps—call it what you please, "cavalry," or "mounted infantry," I should,

1st. Select none but active, intelligent men of light weight, not to exceed one hundred and forty (140) pounds.

2d. Accept horses not more than fifteen hands high, nor weighing more than 1000 to 1100 pounds.

3d. Arm the men with a light breech-loading or repeating rifle.

4th. Make the equipments as light as the demands of the Service would justify; saddles, bridles and the soldiers' accoutrements of the lightest materials possible.

5th. I should not allow the soldier to carry either a sabre or pistol, but provide a light scabbard of leather or wood for the former, to be permanently attached to the saddle by proper fastenings, and for the latter a holster or perhaps holsters for two light pistols. I should reduce the size and weight of our regulation sabre about one-third, and as I have said, carry it in a leather or wooden scabbard, never to be drawn except in action, for inspection, or, perhaps, occasional sabre drills, and the same with the pistol. In modern warfare the soldier rarely has occasion to use either his sabre or pistol, and I would give it to him to let him feel, that in case of a mounted charge, or *mêlée*, he would have something in his hand, sword or pistol, that he could use at close quarters, for attack or defense.

The great improvement in rapid firing long range guns, has made it next to impossible for cavalry to charge infantry or artillery, except when it surprises them. The cavalryman of modern times, must be prepared to fight an infantryman with his own weapons; with a mounted command such as I have described, of course drilled and disciplined, I should never hesitate to attack infantry. My observation after experience with both arms of the Service, convinced me that the dismounted cavalry skirmisher was more daring and audacious than the infantryman, and when they closed the ranks in line of battle, I found the cavalry equally effective. A mounted soldier has a wider range of operations, he is thrown more frequently on his own resources, he is more fertile in expedients, from the nature of the service; hence, I say, none but active intelligent men ought to be enlisted in the cavalry.

The mounted troops are the eyes and ears of an army. They are expected to be constantly on the alert, to watch the outposts, guard the flanks and, if need be, the rear of the Army. They are expected to penetrate the lines of an enemy when necessary, to raid his line of communications, destroy his trains when possible, and by constant scouting keep advised of his movements, numbers, etc., etc. They can accomplish all these things as effectually armed and mounted as I have suggested, as when equipped simply as cavalry under the old system. Such a mounted man can see and hear as well, he can move as rapidly, with a good, trusty breech-loading rifle strapped to his back and with his pistol and sabre in reach; (he has no need for them except when mounted). He can take a hand, dismounted, in a pitched battle if need be (and he can be spared from his mounted duties) with his infantry and artillery brother, and his infantry brother would not be ashamed of his association.

I should attach to each mounted division, such as I have described, not less than one battery of horse artillery; and if but one, there should be six guns—three sections of two guns each, to be a constant companion of the mounted division. Ten per cent. of an army of 300,000 men mounted, armed and equipped as I have suggested, commanded by a vigilant, daring, well poised officer, could play havoc with an army of equal strength not similarly provided. The commander need not know too much about tactics or the

Art of War as taught in the books, but he should have the judgment to know when and where to strike, and the audacity and courage to depart from established rules, when a rule improvised by himself will answer his purpose. I do not mean by this to convey the impression that I think an educated soldier may not be a successful leader of mounted troops, because we had many striking illustrations of the contrary, as you know, in our late Civil War; but what I mean to say is, that a successful commander of such a corps as I have described, must have other qualifications than those he acquires from books. Of the class we might designate as belonging to the list of uneducated soldiers, we had also many distinguished examples on both sides. So that in considering any change in a military system regard should be had to the material at hand out of which the new system is to be made.

Major Hutton in his lecture proposed the following plan for the creation of a force of Mounted Infantry :

* * * * *

" There are three ways in which a force of Mounted Infantry may be created.

1.—By taking one or more infantry battalions entire, and mounting them,

This plan would entail such wholesale drafting and redrafting of unsuitable officers and men that it would be tantamount to raising a new corps. Speaking generally, there are only a small proportion of officers, non-commissioned officers and men in an ordinary infantry battalion, who are capable, or who would be willing to be turned, bodily, into mounted men. Again, it would amount to reducing the infantry branch of the Army by one or more cadre.

2.—By taking a company complete, viz., 5 officers and 128 non-commissioned officers and men from certain selected regiments, combining the companies so obtained, and making them into a regiment.

This plan would practically amount to emasculating the battalions from which the companies were drawn. No infantry battalion could stand the drain of 5 of its best officers, and 128 of its best non-commissioned officers and men at the very time when all its best men were most needed, viz., at a mobilization, when a National emergency was imminent.

3.—By obtaining a small detachment, viz., one-fourth of a company, from a large number of infantry battalions, and then making these units into companies, and the companies into regiments. Each detachments, viz., one-fourth of a company, consists of 1 officer, and 32 non-commissioned officers and men, and is a complete unit in itself, which remains intact in the mounted infantry company and regiment, and is always representative of the regiment from which it comes, bearing its name, and which, while maintaining its own traditions and *esprit de corps*, would, after the occasion for its services in the mounted infantry regiment has past, return to duty with its own battalion, bearing with it all the credit and good name which it might have gained while serving in the *Corps d' Elite*.

The drawback to the latter system is obvious, and the task of welding into a harmonious whole so varied a number of units is no small one; there are, however, advantages in it which do not at first sight appear.

(a) Infantry battalions can easily spare so small a detachment.

(b) Service of this special kind is very popular with officers and men on account of the opportunity afforded for individual distinction, and, consequently, the best men come forward to volunteer.

(c) The wholesome emulation between the regimental representatives is a sure means of obtaining and maintaining a very high standard of efficiency."

* * * * *

I have expressed a doubt of the practicability of this plan. The results I can scarcely

think will be satisfactory, and I should fear that a good foot soldier might be rendered inefficient without getting a good mounted one—although Major Hutton says a two months' course of training at Aldershot, on that plan, has been satisfactory. If it is intended to make a permanent corps of the regiment thus created, and others are to be organized in the same way, until the percentage of mounted troops to foot soldiers is reached, it may succeed; but will at last come to about what I have suggested, that all mounted troops should be mounted infantry, upon which will fall the duties heretofore performed by cavalry. If that is the idea then it may answer, but I would prefer to enlist the men as mounted soldiers and keep them as such. A man for mounted service must know something more than how to straddle a horse. He must know how to mount and dismount with ease to himself and his horse. He must know how to ride so as to impose as light a burden and as little fatigue as possible upon the animal. He must know how to care for his horse, how to spare him when occasion offers, and how to adjust his saddle and accoutrements. All this requires training and more or less of aptitude. If he is called upon to act as infantry, to fight on foot, he must be taught in these duties also. So that I should have the mounted infantryman as separate and distinct from the foot soldier, as regards his training, discipline, organization and command as the cavalry soldier now is.

I had an opportunity, about two years and a half ago, of observing the manoeuvres of the 14th German Army Corps near Strasburg. It was composed of 35 battalions of infantry, 14 regiments of cavalry and 20 batteries of artillery, with a full quota of field and ordnance trains, a pretty good sized army in itself. I was much surprised to find that the German cavalry soldier sat his horse well, rode with ease, and was generally well mounted on a light, active horse. He was too much armed, however, some of the regiments having a lance, carbine, pistol and sabre. The former is of no earthly use, except for ornament, and the pistol and sabre, as I have remarked, are rarely called into use. This body of German cavalry, mounted as they were, and appropriately armed, under a competent commander, ought to be a formidable adjunct to an army in active service. Many of us on this side of the Atlantic were very much surprised at the small figure the cavalry cut in the late Franco-German War. If the accounts we received were to be relied on, there seems to have been a most auspicious opportunity for cavalry operations on both sides, especially after the German army began its forward movement on Paris. But, of course, it is difficult to judge at this distance with no other sources of information than that derived from newspaper correspondence.

Brig.-Gen. Thomas T. Munford, (late) C. S. A.*

Many thanks for your kind letter, accompanying the very interesting paper, written by Major E. T. H. Hutton, D. A. A. G. King's Royal Rifles of the British Army. It recalls to my mind, vividly, scenes that were indelibly impressed, during the four, slowly revolving years I spent "in the saddle" as a cavalry officer in the Confederate Army. My vocation as a soldier terminated, as it began, with that Army.

The true soldiers of the Civil War, who fought on opposite sides and saw sabres crossed upon many fields of battle, realize the fact that patriotism and valor was not confined to either side of the Potomac or Mississippi Rivers. United as we are to-day under our Country's flag, the "Star Spangled Banner," like the finest toned bugle, which is made up by a fusion of the best metals, we enjoy its sweetest notes of Peace, but by a single blast it can sound an alarm which will make hostile nations pause and give ear, and its echo will again bring together her good men and true from every quarter of the Union.

It is not pleasant (unless done in a pleasant way) to deny the premises laid down

* Commanding a division of Cavalry, Army of Northern Virginia, 1864.

by a comrade, or a *confrere* in arms. I do not agree with Major Hutton, and while I will not pretend to follow him *seriatim* I think I can show that he greatly underestimates the cavalry arm of the Service. I believe that cavalry, *well officered* and thoroughly equipped, are able to perform any duty that any other armed troops ever did or ever will perform. Frederick The Great inaugurated the light horse batteries, and massed his cavalry on his flanks. Napoleon saw that to be effective the two arms must be combined; but it was left to the American armies to complete the equipment so that, with cavalry *made up* of horsemen who love the Service, who love the horse, armed with a light straight sabre, a light magazine-rifle, and a repeating pistol, associated with flying-artillery, whose men (in association with the cavalry) will rely upon their own guns, with no side-arms, we have an organization that is self-reliant and defiant, described by the old song:

"The Dragoon bold, who scorns all care,
As he gallops along with his uncropped hair."

But there must be sympathy between the man and the horse, each to know the other's worth. Men raised in the rural districts, who grow up with horses and ride them as boys as soon as they can hold on by themselves, are horsemen; the same class of men are accustomed to arms; such a man will give a part of an apple to his horse, and if, as a lonely picket, he sits in the chilly winds of December, without even a tree to shelter him from the cold blast or rain, when his "hard tack" rattles in his haversack and his hungry horse whinnies at the sound, he will often share with him his scanty ration. Do not give that man a miserable jade, but furnish him with a *horse*, and he will *keep* him a horse.

"As when a sprightly courser, long confined
And pampered in his stall, breaks away
And runs at large o'er all the echoing field,
To bathe his sides accustomed in the stream
Of some cool-flowing river; high he bears
His head exulting; o'er his shoulders waves
His mane luxuriant. Of his beauty proud,
He springs along with light and active limbs,
To seek his well-known haunts and pastures gay."

Let the horse artilleryman, who is a part of the cavalry, know and feel that a strong well-kept horse is the mainspring of the battery, and that when the battery is charged by the enemy (as was the case of Breathed's Battery camp near Charlottesville, Va., 1864, during Custer's raid) a sponge staff will reach farther than a sabre, and that grape and canister beat anything ever used at close quarters if the guns are not aimed too high. Men who depended upon their guns *alone*, without sidearms, as Chews', Thompson's, Breathed's, Johnson's, Moorman's, Hart's and McGregor's batteries did, in the Confederate Army of Northern Virginia, seldom lost a gun, and they were rarely ever captured. The enemy will recoil before they reach the guns—double shot—*with cool-headed officers to command them.*

In time of Peace, men can be taught to ride; in time of War, volunteers must be relied upon; in this country, then, if each man is received into the Arm of the Service of his taste (select men accustomed to horses and arms for the cavalry), you will have contented troops, with the efficiency that nature in her bounty bestows.

I have seen scores of men tumble from their horses in a charge in Jackson's Valley Campaign of 1862, who were more afraid of their horses than of our men; they would stand after they got on the ground; they were put into the Union Army to fill up companies. The time came when the Union cavalry officers would have none such in their commands, and the Confederates were then deprived of a source of supply of good accoutrements and equipments so much needed in our Army.

The cavalry being the "eyes and ears" of the Army, are intrusted largely with outpost duty, scouting, patrolling, picketing and guarding the flanks of the Army, and are largely responsible for all information as to the movement of the enemy, but a picket or scout should be armed so as to be able to protect himself.

The sabre, in an open country, is formidable, and its glitter in the sun with banners streaming near, presents an ugly picture to those of the same Arm, who motionless dare receive them; but if a ditch or a stone wall, or good solid stake-fence intervenes, or a couple of them, on either side of the road, between two opposing bodies of cavalry, the cavalry that will dismount half its men with repeating rifles, and let the others remain mounted and use the repeating pistols when they come near, will destroy the best regiment that ever flashed a blade, in their attempt to tear away the obstacle and drive off their opponents. Stonewall Jackson had but one slogan for his cavalry—"A bold front, and a dash at their weakest point," or a surprise. He had but a handful of cavalry, comparatively speaking, in his Valley campaign.

In the Valley campaign of Early and Sheridan, when Early retreated at Winchester, he left one little brigade of cavalry of four regiments (the Second Brigade) and two pieces of artillery to cover his rear; that brigade held Fort Hill, north of the town; three of its regiments dismounted behind the works, with rifles, repulsed every cavalry charge, and retired from the field, in sight of two full divisions of Sheridan's Cavalry, north of us, and Wilson's Division of Cavalry to the east of us, and in full view. This they could not have done if they had not been armed with rifles. We were hurried that night to Front Royal to guard the fords of the river and to cover the Luray Valley. There the First, Second and Fourth Virginia Cavalry dismounted, and with rifles occupied each a ford and held two full divisions of the Federal cavalry at bay, from dawn until eight o'clock, and moved off to the left, passing three defiles, uniting with the rest of the division at Milford. Our only salvation and that of General Early's Army, was to hold that place and keep at bay the two divisions of Federal cavalry; this we could not have done without the use of rifles.

Let us glance at the Spottsylvania campaign, when General Grant started the great "on to Richmond" flanking movement on the 7th and 8th of May, 1864. Fitz Lee's Division of Cavalry, dismounted, confronted on the Todd's Tavern Road the head of one of Grant's columns—Merritt's Division of Cavalry, supported by Warren's Corps. General Hampton at the same time was on the Shady Grove Road opposing another column. General A. A. Humphreys in "Campaigns of the Civil War, 1864 and 1865," page 59, says: "Fitz Lee's Division of Cavalry was on the road, which they had barricaded by felling trees across it" (this is a mistake; we piled up dead logs and rails, we had no *pioneers* nor *axes*) "and disputed every foot of ground and in the darkness of the night, General Merritt found it exceedingly difficult to make any progress; at 6 A. M. General Warren, upon an intimation from General Merritt that his infantry could push the enemy faster than he could, ordered an advance of his corps, Robinson's Division now leading." General Humphreys' statement implies, but does not distinctly state the fact, that we were dismounted and employing our rifles. At Cold Harbor, on Turkey Ridge, on the 30th May, same campaign, the same division, dismounted, protected General Lee's right flank until General John C. Breckenridge's division relieved us.

Gen. Humphreys, in his Campaigns of '64 and '65, in describing the greatest cavalry fight of the War in Virginia (judged by results), the encounter at Trevillian's Depot between Hampton and Sheridan, says in a foot-note: "When Fitz Lee's Division went in on Sheridan's left, dismounted, they were mistaken by Gens. Torbert and Sheridan for infantry." Sheridan said it was Pickett's Division. The effect was as formidable as if they had, indeed, been infantry, and Sheridan retired before them.

I will add one more illustration, the Battle of Five Forks, on the 1st of April, 1865, so disastrous to the Confederate Army. Gen. Sheridan massed *his dismounted cavalry* in front of Gen. Pickett's infantry. The Fifth Corps under Gen. G. K. Warren was moved up so as to be used as a turning column, on Pickett's left and rear. Fitz Lee's Division, partly dismounted, had been posted on Pickett's left on the north of the White Oak Road; thus a small division of Confederate cavalry, dismounted, faced a corps of Federal infantry. (In the Warren Court-Martial, see page 18).

When the battle was opened on the 1st of April (see findings of the Warren Court of Inquiry). "When Gen. Ayres" (the head of the column of the 5th Corps, U. S. infantry) "command struck the White Oak road, it received a fire in its flank from the enemy's return, nearly at right angles to the road; he changed his front immediately at right angles and faced the return; *his right* receiving a fire from Munford's Cavalry Division of dismounted cavalry, distributed along the edge of the woods on the north of the White Oak road; there was some confusion, which was immediately checked by the exertions of General Sheridan, General Ayres and their officers." On the same page, "it appears from evidence that these two divisions (Ayres' and Crawford's) were operating in the woods and over difficult country, and *received a fire in their flank from the dismounted cavalry* of Munford, posted in the woods, to the north of White Oak road, *which led to the belief, for some time, that the enemy had a line of battle in front*, and this may furnish one reason why it was so difficult at first to change their direction to the proper one." On page 100 of the proceedings of the Court, General Sheridan says of the Fifth Corps under our fire: "There was great confusion and timidity on the part of the men, in fact, I began to have some doubts as to whether I was going to be successful or not. Our skirmish line lay down, and the fire of the enemy was very slight; the line became confused and commenced firing straight in the air; the poor fellows had been fighting behind breastworks for a long period, and when they got out to attack breastworks they seemed to have been a little timid. I began to get alarmed; I had accompanied General Warren up to that period, then I rode out in front of this line of battle and helped to remedy the confusion."

I have endeavored, in a rambling and hurried way, to give my views of the use of cavalry, and have made no statement that has not come under my personal observation. It will be seen from the foregoing that I have the greatest confidence in the efficiency of the cavalry equipped (in addition to the sabre) with light magazine guns and repeating pistols, and ready on occasion to dismount and act as infantry (where, of course, they are provided with snaps to hang their pistols and with sabres hooked to their saddles).

I do not concur with Major Hutton as to the superior efficiency of infantry temporarily mounted for "rapid transit." I do not admit that they would be more formidable than cavalry equipped as indicated above; and an insuperable objection to his scheme is the impracticability of having at hand, at the exact moment, the necessary number of supernumerary mounts, to be cared for in an army.

This is a day of utility; every good horse that can be spared should be held for the use of the cavalry, artillery, line officers and staff. In the time of War we want the best, and more than have ever been used before. Railroads will move infantry fast enough, assisted by field telegraphy and telephones. Give the cavalry the opportunity, and let them know what is expected of them; they will hold any place that can be held by the same number of the best troops in the world.

LYNCHBURG, VA., July 20, 1889.

Bvt. Major-General August V. Kautz, Colonel 8th Infantry, U.S. A.*

Major Hutton's lecture and the discussion which accompanies it impress me with the belief that it will require the ordeal of War to unite military theorists on the use of the horse in the wars of the future. To my mind the test will have but one result: he will be used to carry the most efficient marksmen, armed with the most perfect weapon of the time, to the point of action, to fight on foot. This result will come from two sources: the cavalry will desire to do efficient service, and be able to protect themselves as well as defeat the enemy; the infantry will want to reach the field of action as fresh and as quickly as possible.

If during the Rebellion the increased range of the infantry arm induced the cavalry to box up their sabres whenever they could get carbines or repeating rifles, how much more certainly will the sabre be discarded in the next war, when the wonderful improvement that has taken place in arms, since, is appreciated. Will any soldier care to add a pistol to his load when he has been provided with a perfected magazine gun?

The ideal cavalryman of the past will have no place in the field in the wars of the future; self-preservation will lead him to demand the long-range weapon, and he will of necessity prefer to be on the ground when he uses it. The infantryman will crave the horse to help him over the increased distances that the extended lines of battle will bring about, but he will have no use for him in action, nor until the battle is lost or won.

The training of the man and horse to this end I look upon as the proper instruction, whether called cavalry or mounted infantry. That we should go on with our present methods of drill and instruction with weapons that can never be used, is deplored by every progressive military student. Our present drill tactics were conceived in the days of smooth-bore muskets, and are as obsolete. Our camps of instruction to rehearse these antiquated lessons are a detriment as well as an absolute loss of time, for they can have no application in any war in this age of long-range magazine rifles, smokeless and noiseless explosives; and that troops should be made to make marches of hundreds of miles for the purpose of practising these extinct exercises, when, in this age of steam and railroads, no general would waste his precious time in so doing, is on a par with the general lack of progress in the military art in our country. In the same category will be our failure to note that the horse has lost his prestige as a warrior, but has gained in value as a means of War.

Major-General David McM. Gregg, (late) U. S. V.†

I have read with great interest the address of Major Hutton of the King's Royal Rifles, on the subject of Mounted Infantry, as also the comments of the several officers of the British Army present at the meeting of the Aldershot Military Society before which the address was made.

In considering the subject, the mind of an American cavalry officer, who served in the War of the Rebellion, would naturally seek in his experience in that War facts upon which to form an opinion. Now, the conditions under which that War was waged were so peculiar and so distinctively different from those attending European wars that it can be readily understood that an American cavalry officer might fail to be convinced that the general efficiency of an army would be increased by the addition of a force of mounted infantry. I do not recall any instance in our late war in which I believe the substitution of a mounted infantry force for the entire body of cavalry commanded by me, or for any portion of it, would have produced better results than were attained. In

* Major-General U. S. V., commanding Cavalry, Army of the James, 1864.

† Commanding 2d Division Cavalry Corps, Army of the Potomac.

the Army of the Potomac, our cavalry so frequently, indeed, I would say regretfully, even at this distant day, so generally, were compelled to engage the enemy dismounted, that its horses, for the time being, became an element of weakness. The situation would not now have been bettered by the substitution of mounted infantry.

The effective ranges of the carbine carried by our cavalry and a fire-arm that might have been carried by mounted infantry at that time, would not have been so different as to have increased, to any extent, the efficiency of the latter over the former.

The vast amount of picket duty imposed on our cavalry and which proved so ruinous to its efficiency, together with the unceasing escort of trains and orderly duty at head-quarters of every degree, had it been shared by mounted infantry, would have resulted in making the two branches of the mounted service practically one. Had such duties been confined to the cavalry, in the presence of a force of mounted infantry, great dissatisfaction would have existed in the former.

READING, PA., July 31, 1889.

II.

"An American War College."

Bvt. Lt.-Col. A. A. Woodhull, Major, Medical Department.

LIEUTENANT WAGNER'S recital of what is done at Leavenworth, which all those on duty there can confirm, delivers the School from the imputation, if such ever was deserved, of being simply an institution for feeble-minded youth. It is in a fair way to become a War College, as his paper implies.

The three great disadvantages under which the School labors, are: (1) The intellectual differences in the students when detailed. (2) The narrow field from which the instructors are selected. (3) The want of quarters. It, unfortunately, is true that there are officers whose mental acquisitions, if not their power of such acquisition, are best marked by the negative sign. They have been truthfully described as spending their years "in accumulating ignorance." When a colonel sends these regimental dunces they generally justify his estimate of them. Some colonels appear to make their details on the principle of regimental exile, and some students apply because of the exemption from ordinary duty and the presumed leisure such a place will give a man of fair military education. It is only right to add that the most in both of these groups, however unwillingly some of them may come, soon catch the spirit of the School and make full use of its advantages. Still other student-officers come, probably at their own request, intending to secure the real advantages that they understand await them. These profit to the fullest by their opportunities.

As the weakest point of any stress-bearing structure is the measure of its actual strength, so the real problem is, what to do with the men who have never studied and who do not understand the process, and with those others whose faculty of intellectual absorption has atrophied from disuse. Men of thirty-five should be exempt on this account unless, already having habits of study, they apply, when they might be sent as supernumeraries. The scheme proposed by Lieut. Wagner for the better preparation and differentiation of the candidates in the ranks, who now are too largely accepted on faith, is admirable and should be carried out. But there should also be some similar preparatory school for those unfortunates, whatever their antecedents, already bearing commissions, who know nothing, and it should be one embracing penalties as well as rewards.

It matters not whether the man is a graduate of the Military Academy, is a civil appointee, or has risen from the ranks; in each instance there is work before him and it is what is in him, not where he came from, that decides his standing. The gradu-

ates must study to stand well ; the men who have carried a rifle stand well by study. This question, how shall the ignorami cease to hold back their swifter yoke-fellows has two solutions : either by having a larger staff and graduating annually a class after a normal course of two years, so that, as in all other colleges, the incompetent may be turned back as often as necessary, or by having, as just suggested, a preliminary school for the intellectual minors where they may be grounded in the rudiments before entering the War College. This is a matter of detail that competent authority can easily arrange. There is no doubt that as each regiment averages at least two new officers a year, so at least two students from each will be required to maintain, not to overcome, the balance.

Until the very time of this writing, with two exceptions, the instructors have been the officers who happened in the ordinary course of military duty, to be stationed at the post, and it speaks very well for the average ability of the Army that so creditable a standard of instruction has been maintained. Within a few days four lieutenants, detached from their companies, have been ordered on the staff from the beginning of the next term. If this just policy is pursued and special instructors can be had in all the branches, the work should be still higher. It is an open question whether the instructors should be relieved *pro tempore* from line duties, or should keep up the ordinary alliance with their commands. It would be unquestionably to the intellectual advantage of the teachers, or, to put it on the lowest ground, it would be easier for them, to be free from the annoyance of routine company duty ; but it may be doubtful whether the moral effect of this divorce would be advantageous in a garrisoned station like this. Local opinion is at variance, with teaching subalterns seriously deprecating daily duty under arms. But if the instructors in all cases are to be relieved from such duty, there will be conceivable if not actual friction between the officers handling the troops, " the practical men," and those whom they might be disposed to regard as *doctrinaires* pointing out a road they could not follow. It may be by carefully selecting the captains, by judicious transfer of the lieutenants within the regiments, and by attaching the selected subalterns for company duty as supernumeraries, and then by excusing them from all but school duty during the season they are engaged in the section-room, but never relieving the captains from administrative duties, this possible difficulty would be avoided and the equilibrium be maintained.

The question of quarters is a very serious one, while so many junior officers marry. The regulation allowance not only destroys comfort, but forbids reasonable study by any man whose family is present and who is limited to one room and a kitchen, or to anything like it. The number of separate buildings or of suites is inadequate for a large married contingent. Matrimony should be no plea to evade the duties, nor bar to exclude the privileges of this higher education. The Government should recognize the facts and provide ample quarters for all whom the School may call to it.

The suggestion that the benefits of the School may be extended to officers of the National Guard is admirable in the interest of general military education. As Lieut. Wagner has suggested in later conversation, this may easily be accomplished by a Congressional provision for the muster-in, for two years, of a suitable number of additional second-lieutenants under such regulations as the Secretary of War may determine. Their pay would be a very trifling matter, and it would obviate the necessity for multiple legislation by States. The practical difficulty would probably arise in finding young Guard officers who could spare two years for this purpose from their current affairs.

Officers familiar with the School are probably unanimous in the opinion that certain changes in its curriculum might advantageously be made, and nearly unanimous as to the changes themselves ; but a discussion of its internal affairs in this sense is hardly in order here.

With the selection of instructors, an increase of students and such modification in the studies as experience indicates, the Infantry and Cavalry School will well merit the designation of a War College and the support that such an institution deserves.

FORT LEAVENWORTH, July, 1889.

Bvt. Major-General James B. Fry, U. S. A.

Notwithstanding ordinary observation shows that military institutions and military progress in our country derive their birth and early growth from individual effort, and precede legislation, I must confess my surprise at the rapid strides, unaided by Congress, which the War College at Fort Leavenworth has made, as disclosed by Lieutenant Wagner's excellent article.

It is hardly modest for those who have lived quite in the dark about what the officers in charge of the College have done, to make suggestions concerning the enterprise they have in hand; nor would I venture beyond the invitation to comment upon the points presented in Lieutenant Wagner's article.

Speaking of the difficulty arising from the necessity the College is under "of accepting students of widely various degrees of preparation, with the the object of putting them all through the same course of study," Mr. Wagner says: "The system of promotion (from the ranks) should be changed," and that the candidates should first pass an examination identical with that for admission to West Point, and should then be sent to a school (to be established by the Government for the purpose), and take a year's course in algebra, geometry, trigonometry, surveying and drawing; that they should be specially cared for while taking that course, and that all who pass an examination at the end of the year should be commissioned, and the others should be discharged or returned to duty in their non-commissioned grades, as they might elect. This suggestion strikes me as good, not only for the specific object in view, but also because the difficulty of getting unfit officers out of our way is so great, as to impose a special obligation upon us to resort to all means to prevent unfit candidates from getting into it. Mr. Wagner asks: "What shall be done with the officers who are found deficient at the school?" Their subsequent careers being undisturbed, and their promotion following in due course, regardless of the adverse finding of the College, seems, he says very truly, like "reward of demerit;" and he suggests that either of two remedies which he mentions would afford relief. If an officer is unfit for his office, the bitter logic of the case calls for his discharge. But taking things as they are, my voice is for trying the milder remedy first. To begin with, I would let forfeiture of the right to promotion be the penalty of fully ascertained deficiency, *whether that deficiency be determined at Leavenworth or elsewhere*. It should be determined somewhere in all cases. The Leavenworth College affording accommodations for comparatively few officers, it would, it seems to me, be unjust and injurious to stop the promotion of a lieutenant who failed in an enforced examination there, while other lieutenants were promoted without being subjected to any examination at all.

Mr. Wagner's suggestion about opening the Leavenworth College to officers of the National Guard, to be detailed by Governors of States, seems to me wise and practicable.

The military service and the country are to be congratulated upon the establishment of the War Colleges at Willet's Point, Fort Monroe, Fort Leavenworth and Fort Riley. These institutions owe their existence and prosperity to the talent, zeal and patriotism of officers of the Army working within the law, but without expressed authority of Congress, and with limited means. It is to be hoped the day is not far distant when the Government will support and guide all of them by legislation, as it does the Military Academy at West Point. Intending everything I say, without re-

servation or conditions, to be in support and encouragement of these schools, I may be permitted to add, that while the officer of the Army must always be a *student*, he should not always be a *pupil*. The time comes, at last, when, to reach the higher aims of life, the student must be released from the shackles of the schoolmaster; when *schooling* and manliness become incompatible—when individuality must be developed, and the man must be free. I do not overlook the rigidity and peculiarity of the military profession when I say that this is true of all systems of education and of all professions and employments. Undoubtedly this time comes earlier for some than for others. When it comes, open and free arenas of learning and progress, like the voluntary association called the "Military Service Institution," afford channels for thought and expression. Now and then we meet with gifted persons, who never, *as men*, appear to need schooling. When a Second Lieutenant of Infantry, Mr. Wagner, by his essay upon our national defenses, gained the gold medal of the Military Service Institution in a competition with nine officers of rank and ability. One member of the Board which passed upon these essays—all *anonymous*—was an officer (near the head of the Engineer Corps) distinguished not only as a military engineer and for his literary attainments, but also for his gallantry and scars in the Mexican War and the Civil War. When he had read, carefully, all the articles, he said: "I, of course, do not know who wrote any of these articles, but I do know that this one (referring to Mr. Wagner's) was written by an officer of the Engineer Corps, and a member of the Board of Engineers. No one not a member of that Board could have had the information." It was written by a young and comparatively unknown second lieutenant of infantry, who probably had never seen the Board of Engineers or many of its members.

It may be said that the Military Service Institution not only brought Lieutenant Wagner's military ability to the attention of the Army and the country, but in some degree, at least, made it known to himself.

NEWPORT, R. I., July 10, 1889.

III.

"New Course of Instruction—Fort Monroe." †

Lieut.-Colonel Royal T. Frank, 2d Artillery.*

AFTER a cursory statement of the interruptions and embarrassments which have attended the progress of the Artillery School from its establishment, in 1824, through its elementary period after its re-establishment at the close of the Civil War, and a brief comparison of the new course with that which immediately preceded it, Captain Birkhimer, in his article entitled "New Course of Instruction—Fort Monroe," though speaking generally in commendation of the changes introduced, expresses the opinion that the new course is overcrowded and perhaps too extensive; that that which was already exacting enough has been made more difficult, and finally suggests the possibility, through want of competent instructors, of witnessing the melancholy spectacle of the blind leading the blind, or the still more melancholy spectacle of the blind leading those who are able to see.

From this statement it is seen that the Artillery School was among the earliest of our military institutions, and that it has had, since the close of the Civil War, an uninterrupted existence of more than twenty years. Surely the time has come when the School should be given a course of instruction which will enable it to fulfil the purpose of its establishment. If there have been reasons heretofore for not doing so, they no longer exist. With few exceptions student officers are young men who have

*Commandant Artillery School, Fort Monroe.

† This JOURNAL for July, 1889.

graduated high in their classes at West Point, many of them first section men, and all of them capable of mastering every requirement of a modern system of sea-coast defense. They are active and animated by professional pride and ambition. To keep them on a course of law, almost identical with that which they had as cadets, or in marking time on any other ground already gone over, would, indeed, be questionable policy. What they require, and the interest of the Service demands, is a course of instruction that will prepare them to perform all the duties of an artillerist in connection with a modern system of sea-coast defense—every duty that might devolve upon them in the event of foreign war and in preparation for such an event. The new course does not embrace more than recent writers of recognized authority have stated to be essential to such duties. It is, doubtless, true that the course is more extensive and more difficult than former ones, but its increased importance and interest for the student, as well as the better adjustment and employment of time, will secure for it a more earnest effort and render its attainment as easy and practicable as that which preceded it.

The difficulties to be encountered in undertaking this course with the limited means at the disposal of the Artillery School, were fully appreciated, and means were suggested by which they might be overcome. These have been regarded with favor, and while it would be unreasonable to expect that all that has been proposed can be realized at once, there is no reason to doubt that time and proper endeavor will accomplish all that is desired. When means are limited the process of development is necessarily slow.

With regard to infantry exercises, it is expressly stated that for want of time they are limited to the necessities of the School which, perhaps, was all that need to have been said, but recruits are received from depots and enlisted here in considerable numbers and the mention of particular exercises relates chiefly to their instruction.

It may be said with modesty that the present corps of instructors is as good as the School has ever had. The reputation of some of them is not limited to this School; that of all is as good as the average. They are of mature age and the most ardent friend of military education need give himself no unhappy moments nor sleepless nights lest he witness spectacles such as those described.

First Lieutenant E. M. Weaver, 2d Artillery.

It is, without doubt, one of the most encouraging signs of the times that practical and theoretical post-graduate instruction is receiving more attention just now than it has received, perhaps, ever before. It is especially opportune that a free discussion be had as to the needs of the Service in the matter of post-graduate artillery instruction, in connection with the new "Programme of Instruction" of the Artillery School at Fort Monroe.

In opening up the matter to public discussion, the origin should be placed at the fundamental relation existing between an ante-graduate course and a post-graduate course.

West Point, admittedly, merely endeavors to give such a general mental training to its graduates as to fit them for *beginning* professional life in any branch of the Service; it strives only to provide a common foundation for all, firm and substantial, upon which any of the special service superstructures may be placed, and developed with confidence to any limit.

Until lately it has been the anomaly of our military educational system that no proper use has been made of this excellent foundation for the purpose of higher education; it has, as it were, been left exposed to the destructive effect of the elements—to be disintegrated by the freezing chilliness of official discouragement and covered

out of sight by the light literature rubbish that ever comes crowding in upon minds not diverted into professional channels by the operation of some continuous comprehensive scheme.

It ought to be the object of a post-graduate school to start the superstructure along proper lines. It is here that minds, that have been subjected to only a necessary general training, should be so inclined as to serve that special end best suited to inherent talents and tendencies.

The mere mapping out of the two fields is sufficient to show that different methods of instruction must be applied in each. In the one *all* must attain, by a greater or less degree of forcing, the common standard considered necessary as a basis for the higher education. In the other, starting with this standard basis, *each student* ought to be encouraged to develop along that particular line of study most suited to his own peculiar mental nature. In the first, the *class-system* must of necessity be practiced, and we are, therefore, led to note the virtues of the West Point ante-graduate system in accomplishing the end in view. On the other hand it appears clear that post-graduate instruction ought to avoid all the forcing necessarily associated with any "class-system," and seek, rather, a method of imparting instruction that looks more intently to the *individual*, offering no restraint to the development of natural gifts of mind.

It has been suggested that the new Programme of Instruction of the Artillery School is, perhaps, too extensive, since the course of two years is hardly sufficient to instruct, with due care and with sufficient time for reflection, the student officers throughout the whole range of the curriculum. It is believed that this criticism must stand if the methods of instruction heretofore in vogue at Fort Monroe, be continued under the new programme.

In this connection it is suggested that the difficulty lies in the fact that a university post-graduate curriculum has been drawn up, and it is proposed to give instruction in it chiefly by means of the West Point ante-graduate recitation system. If we apply the example of post-graduate civil schools, it is to be noted that the limit to the extent of instruction is only fixed by the present limits of knowledge. The post-graduate schools of law, medicine, engineering, mining, etc., are supposed to be able, under the leadership of eminent professors, to conduct the ambitious student to the ultimate boundary of human knowledge, as it is to-day in any branch he may select to follow. Why should it not be the same in our post-graduate military schools? The only answer to be given is, that our educational "leaders" are not equal to the task. But this is only true because departments have not been clearly defined, the tenure of office of heads of departments has been without permanence, and no effort has been made to encourage young officers to fit themselves for such positions; these are, each and all, susceptible of correction, and, sooner or later, the correction must be made.

It is a commentary on the little attention that has been given to post-graduate instruction, that, whereas the undergraduate school, West Point, is firmly established by law, its departments of instruction clearly defined, and able professors placed in absolute security at the heads of departments, the more important branch of higher education—the climax of the entire system—is left to scramble along hap-hazard on the shifting and precarious basis of *orders*, with heads of departments of instruction not always suited to the task placed before them and often plainly unequal to it.

Until competent men can be placed at the heads of departments of instruction and allowed to retain their positions during efficiency, as in all other educational institutions, it makes little difference, so far as results are concerned, what methods of instruction be followed, or what ground is covered on paper by the programme of instruction,

But if proper methods be followed, it is not thought that the new course at Fort Monroe is too extensive, or beyond the legitimate ambition of a young graduate. In harmony with this line of thought, it is submitted, that the ante-graduate class-recitation system, heretofore practised at Fort Monroe, ought to give way, in large measure, to optional courses, based on the lecture system, with liberal time allowance to student officers for personal examination of authorities and the careful preparation of writings deeper and more comprehensive than the "essays" now provided for. If a young officer is to be encouraged to adopt a special line of professional study, he ought to be permitted to elect it, and to pursue it largely in an exclusive manner; and Fort Monroe is the place at which the young sea-coast artilleryman can, better than at any other, receive the initial impulse.

It is argued by some that the daily recitation, with its accompanying mark, is necessary for the purpose of grading the class of officers. But why, it may be asked, is it necessary to grade the class? If the object of post-graduate instruction be to develop habits of personal investigation, and study of professional subjects, the recitation system will certainly produce a miscarriage; this is amply evidenced in the distaste West Point graduates, and even many artillery school graduates, have for books and for professional work immediately after graduation. Besides, if the real object of post-graduate instruction be properly and successfully followed, the true worth of the student officer will be revealed in course of time through his works. Then, again, a grading on a fixed obligatory course is no adequate measure of the relative merits of men in their capacities to develop as specialists along some one line. How often has this been shown true of the West Point grading; the honors of life have not always, or even often, fallen to star graduates in this age of specialists.

It must be admitted, finally, that there are other means than daily recitations by which officers may be induced to work honestly at the course, and this is all that can be expected.

In my judgment, therefore, the new course is not too extensive, nor can it be made so, provided modern post-graduate methods be adopted, including competent permanent professors as heads of departments, and considerable latitude in permitting the student officers to follow elective courses.

WEST POINT, N. Y., July 20, 1889.

First Lieutenant A. D. Schenck, 2d Artillery.

Lieutenant Birkhimer, in his remarks upon the *New Course of Instruction* at the Artillery School, pertinently calls earnest attention to the twin evils existing at that institution, viz., "marking time at one institution on ground already gone over at another," and "a crowded course of instruction," i. e., "seeking for quantity not quality."

A scrutiny of the list of text-books reveals the fact that the first of these evils still exists to a very large extent, for in many cases they cover much of the same ground which has been already quite thoroughly gone over at West Point, and it is not claimed that better work is done here than at the parent institution. The elaboration of the previous course of study which leads to mere diffusion and perhaps confusion, is not in the line of improvement: too much water in good wine which needs none at all.

The other evil is, no doubt, of more serious moment, as mere repetition is, after all, not the worst of evils for many students. But to seek for quantity rather than quality, without affording ample time for the student to thoroughly digest what it is sought to teach him, is certainly a most reprehensible defect.

The programme of instruction itself would seem to indicate the natural method of correction, as partially pointed out by Lieutenant Birkhimer.

Infantry drills will be the inevitable portion of artillery subalterns for years; they will always be with him when not at an artillery school, and should never be permitted to deprive him of much valuable time when the opportunity is afforded for perfecting his *artillery* education. Again, wherein is to be found the wisdom of trying to make a "plug" telegraph operator out of a one hundred and fifty-dollar lieutenant, when a trained and expert operator can readily be had for less than half the money? Especially, in view of the fact that the lieutenant cannot possibly keep in practice, without which, in less than six months, he would be unable to send or receive a message of six words. Flag signaling must be learned at every artillery post in the Army, and, what is more to the point, in War we shall have a corps of trained experts, whose sole duty it will be to attend to all of these matters. A great deal of valuable time can readily be saved by the elimination of much that has no comparable value with the proper pursuit of other legitimate artillery subjects.

The lapse of time and the establishment of the School at Fort Riley will, unquestionably, simplify the present course of instruction, and afford the student better facilities for perfecting his knowledge of artillery subjects. Artillery service naturally divides itself into that with an army in the field, and service at sea-coast or other permanent works, and proper instruction as naturally follows the same divisions; hence, the Field Artillery School at Fort Riley, and the Sea-coast Artillery School at Fort Monroe. The first will in due time have relegated to its curriculum from that of the latter all that pertains to artillery matters with an army in the field, both field and siege artillery, and all artillery carriages connected with horse power, and with these will naturally go the Department of Military Science. The Sea-coast Artillery School will thus be relieved of a very great burden which it is now forced to assume, and the time thus set free in the course will serve to place the instruction in submarine mining, steam engineering and heavy artillery proper, upon a secure and efficient basis.

But so long as it remains necessary to maintain the Department of Military Science, instruction therein should be aimed more in the direction of its application to *artillery* than the programme indicates, or has been the practice heretofore. How many have there been who have heard beautiful demonstrations in the Art of War, wherein the evolutions of corps of infantry and divisions of cavalry have been described with the most minute accuracy, but wherein the very name of *artillery* never once occurred; for an artilleryman the play of "Hamlet" with the part of the "Prince of Denmark" left out entirely. *Where was the artillery?* what did it do, or fail to do, and *why?* It was generally *there*, but many a time one would never suspect the fact.

Unquestionably the artillery officer must be thoroughly conversant with this phase of the subject in all of its bearings, and to a much greater extent than for officers in any other branch of the Service, as, the battle once on, the tactics clearly point out, and experience confirms the fact, that he is left much more to his own resources, and must himself properly interpret every phase of evolution and conform thereto, very frequently without orders from a general commanding. But in his course of instruction all of this should be the mere preface to what pertains to the artillery on any particular occasion, and this should be the case invariably and not upon rare occasions as at present. It is true that the text-books will afford little or no aid here. Hence the necessity for time to cull the necessary information from the splendid library of the Artillery School, and to put the matter in proper written form.

Battles of our own wars are described with scarcely a word as to the part taken by the artillery therein. The Germans have derived, and profited from the great lesson taught by the methods followed in the grand concentrations of artillery upon the battle-fields of 1870. Equally pertinent lessons could be learned from a proper study of the methods of dispersing to the four winds of Heaven our artillery, in the battles

of 1861-5, but only by making these battles *artillery*, and not infantry and cavalry studies.

In the department of artillery war, why waste, unnecessarily, so much valuable time over long extended technical descriptions of the most minute details of gun, and other constructions? In general all artillery officers should of course be well acquainted with such constructions. But what vitally pertains to their profession is to know what such constructions will accomplish, and be competent to perfectly use them for the purposes designed, and, moreover, to be thoroughly capable of designating what is required for the accomplishment of any given task; not to be able to make the thing. Any man can reasonably be expected to know what kind of clothes he should wear to give the necessary orders therefor, and to know whether good when made, but he is not called upon to learn the trade of a tailor, even theoretically.

In the same number of the *Journal*, in the paper on the French Artillery, will be found a few, but even then sufficiently cogent reasons why artillery officers should have nothing to do directly with the construction of artillery *material*. That they should have a preponderating voice in the determining of what they require, and the testing of the same when constructed, to see whether or not the necessary and reasonable requirements have been fulfilled, for officers in any branch of the Service, in any army, will deny.

FORT WADSWORTH, N. Y. H., July 3, 1889.

Captain James Chester, 3d Artillery.

During my voyage to this country I read with much interest the article by Captain Birkhimer on "The New Course of Instruction, Fort Monroe," and although I have no books of reference at hand, not even the schedule, and poor facilities for writing, I venture to submit a few remarks on some points raised in the paper. It is to be regretted that Captain B. did not enter more fully into the subjects discussed, as his short and general statements are, necessarily, somewhat vague, and often leave his meaning obscure. I do not propose to enter into a discussion of all the points raised or hinted at in the paper, as that task would require greater facilities for reference than are available to me just now; there are, however, two points upon which I venture to submit a few off-hand remarks.

If I understand him correctly, Captain B. says, in substance at least, (1) That every captain of artillery is not necessarily a competent teacher, even of his own specialty; and (2) that artillery efficiency would be enhanced by amalgamation with the ordnance.

The first point is rather a delicate one for me to discuss; but, in view of its importance delicacy must be set aside. That captains of artillery are, or ought to be, masters of their profession in all its branches, may be admitted for sake of argument, however absurd and erroneous such an admission may seem to be in the light of experience. The question then resolves itself into the general one: Can the master of any art or science be made an efficient instructor thereof "By order" as Captain Birkhimer puts it? Few college faculties would willingly admit that. The art of teaching demands special talents when it passes beyond undergraduate work. Text-book teaching is not applicable to a post-graduate course. The undergraduate may, and indeed must, study from a text-book, but the method is too narrow for the post-graduate course. It is too closely akin to cramming. The post-graduate student should study a subject and not a lesson. He should gather knowledge from every author who has contributed to the development of the subject. He should study the circumstances which attended its birth, and follow its growth through all its ramifications to the present day. The whole literature of the subject should be his text-book

if he would acquire a thorough knowledge of it, and shake himself free from the narrow-minded views which are inseparable from text-book studies. When he has thus gone over the whole subject, he may be permitted to form his own conclusions on the theories advanced by text writers; and while he may not have acquired so many hard facts as if he had confined his studies to a single text-book, he will have a better and broader knowledge of the science than if he had crammed himself with the words and punctuation marks of even the very best authority on the subject. If this view be sound, and I certainly think it unassailable, the question arises: How can such a method be practically carried into effect?

The answer to this question will manifestly disclose the true method of all post-graduate teaching, and at the same time indicate the indispensable qualifications of post-graduate teachers.

According to the views above stated, the field to be traversed by every post-graduate student is enormous. It would manifestly be impossible for him to traverse it in two years, or even in a lifetime if he were required to study every author as he did the special writer of his undergraduate text-book. He could not masticate, let alone digest and assimilate, one-tenth part of the literature on the subject in the time allowed. What, then, must be done? Why, somebody else must masticate and digest it for him. It must be carefully prepared and presented for assimilation by some one who has devoted not two or three years, but half a lifetime to the subject. The instructor must be a professor, in fact; he must not only know his subject thoroughly, but he must know how to present it in a condensed and attractive form. It is no easy matter to prepare a subject for the class, even for a perfect master of the science. To prescribe so many pages of a text-book, and to hear a recitation are easy enough, but to prepare and deliver a lecture, and to test a student's knowledge by a searching quiz are not so easy. Of course, we can say nothing about the preparation of a lecture. Perhaps no two professors follow the same rule. But we may describe the lecture and its delivery, and the labor of preparation may be inferred.

The lecturer should set forth in clear and concise language the earliest known views on the subject, writing the name of the author, and the date on the blackboard, so that the students may see as well as hear. He should then proceed to build up the science, writing the names and dates of every author *who has contributed anything new to it*, down to the present day, describing, as he goes along, the several additions or subtractions thus made. His descriptions should be clear and concise, and his delivery distinct and deliberate. At the end of half an hour of such instruction the student will have a better knowledge of the subject than he could acquire in a week's reading.

The indispensable foundation for every post-graduate school is a library. Thither the student should repair, armed with his lecture notes, and consult the original works upon every point which seemed to him to be doubtful or obscure. If any author had presented views which the student's reason rejected, that author should be read with care. Those that agree with his own views may be passed over very cursorily. It is opposition that educates the intellect and broadens the view, so every adverse argument should be given careful attention. Of course every hour in the lecture room should be supplemented with at least two hours in the library, and a day thus spent would have more permanent benefit than a week's cramming.

The quiz on the last lecture should always precede the new lecture, and a skilful examiner will soon discover the extent and thoroughness of the student's knowledge, and form very correct ideas as to his industry and ability. I have no hesitation in saying, that by such a method a post-graduate course at any school would be attractive and easy, as well as effective, as far as the student is concerned. But it would be

laborious and exacting on the instructor. In fact it would require, on his part, not only industry and zeal, but special talents and fitness or he would break down under it or prove a failure. Teaching by the living voice is not popular among instructors because it is laborious. It is not successful because it is not understood, and therefore not fairly tried. But it is the true method of imparting knowledge to post-graduate students for all that.

Having said this much on the method of instruction the assertion somewhat vaguely made by Captain Birkhimer "That every captain of artillery is not necessarily a competent instructor, even of his own specialty," must be accepted as true.

I have time to say, only, a few words on the second point selected for discussion. To present the question properly would require an article in itself, longer, perhaps, than you would care to publish. But the claims and arguments on both sides are fairly well known to artillery and ordnance officers, and need not be stated here in detail. Indeed I have no data at hand from which to make up such a statement, and shall confine myself to the few points which present themselves to the mind, by the simple statement of the proposition. The strong argument against a separate *Ordnance* is that no other nation finds it necessary. Now that argument deserves careful consideration. It seems conclusive at first glance. If the great military nations of Europe can create and maintain their vast armaments without the aid of an ordnance corps, surely such a corps is not a necessity to us. But a closer inspection of foreign systems shows us that there is practically no difference, except in name, between their systems and ours. While we select certain officers when they are young, and train them up in a specialty, so that they may be efficient when they reach commanding grades, they select from the commanding grades in artillery, capable officers for ordnance work, and no doubt keep them at that work, if they are found capable, until they become superannuated. There is no such a thing as rotation in ordnance duties, in the commanding grades, anywhere. If our ordnance and artillery were amalgamated, I hardly think that any revolution would take place. Few field officers of artillery would willingly accept the responsibility attached to the command of Springfield Armory, or any of our manufacturing arsenals; not that they lack ability, but because they have had no experience. The English assertion "That few Americans would decline the command of the Channel fleet if it were offered to them," is true only in politics, and the civil service. It is not wholly true in the Army at any rate, and ordnance officers would remain on ordnance duties even if they were classified under the general name of artillery. It is reasonable to suppose that their experience has made them more fit for such duties than the ablest artillery officer could possibly be. But while amalgamation is not desirable, and the technical branch must be maintained, it should not be permitted to usurp the functions of the combatant artillery. It has been too much the fashion in the not very remote past to ignore the artillery, even when purely artillery questions were under consideration, and to accept the dictum of the ordnance as conclusive. This is a genuine grievance and should be abated. There is plenty of intellectual work for both branches of artillery, without one branch infringing upon the prerogatives, if I may use the word, of the other. The artillery officer has plenty of scientific work to do to satisfy the most enterprising mind. To be sure, in our army at least, he has not been called upon to do such work, but it is his duty to do it, and he should be made to do it. It is, or ought to be, one of his functions to determine the kind and calibre of gun he requires for the work he has to do; to calculate and plan that gun and all its appurtenances, and to prove it, and then when they have been constructed it is, or ought to be, his duty in conjunction with engineer officers to determine the sites and character of all defensive works and their armament. That he has not been called upon to do any of these duties in the past is to be regretted. But amalgamation is not the proper remedy.

There is plenty of distinctive work for the three corps, each in its own specialty, and if any of them usurps, or is commanded to exercise, the functions of any other, the organization is not to blame. It would be unwise to push this question too far, as our common superiors might answer unsatisfactorily if pressed, and we would then have no remedy. But artillery officers may rest assured that the emergency will always find the right man, and will not bother much about his uniform.

GLASGOW, SCOTLAND, July 25th, 1889.

IV.

"A Few Words on Horse Shoeing." *

First Lieutenant C. D. Parkhurst, 4th Artillery.

THE interest in the paper of the above title, written by Major Rodney, as shown by the various comments and criticisms that appear in the JOURNAL, leads me to advance a few ideas upon the subject, particularly as it appears that the hardening process, of which I am a very strong advocate, is not understood.

It is evident that a very general sentiment against shoeing and its attendant ills exists among our mounted officers, and that there is a very strong desire to adopt some method which will not entail upon our horses the cruel and abusive treatment, now practised, as the result of shoeing.

As none of the writers deny the injuries that result to the horse's feet from shoeing, there can be no argument upon that point. I will, therefore, direct all my arguments and statements to the point which is denied, viz.: the ability of the horse's foot, when the horse is used as a beast of burden, to stand the wear and tear unshod; this position being the result of the experience of all the writers who criticise adversely; the main point of all these adverse criticisms being that so far as their experience goes their experiments had resulted in failure. One writer fails to see "why he (Major Rodney) will put his barefooted horses on a bed of rocks for five hours a day," and, as in my opinion that is the key to the whole subject, I may be permitted to refer to that point at length.

In my opinion the very reason for the failures set forth are because the method of hardening used by Major Rodney was not followed, so far as shown by the comments in question. For years I was in command of a cavalry troop, and a very strong advocate of non-shoeing, and pursued presumably the same methods that some followed in these cases, viz.: letting the feet be bare, keeping them as nearly as possible in a natural condition, but at the same time *soft* from standing simply on natural ground when at the picket line or in the stable, and in no case putting the horses on an artificially prepared and hardened surface for the purpose of hardening the hoofs. This picket line, and the stable floors were soft both from their natural character as well as from rain, or the moisture resulting from stalling, and, as a consequence, the hoofs, though harder and tougher than those of shod horses, were natural and more nearly perfect, though more soft as compared with the artificially hardened hoofs resulting from following the hardening process, and, hence, as was shown on numerous occasions, were unable to stand the wear and tear on hard or gritty roads.

The same thing obtained with the horses of the battery in question until the picket line and stable floors were fixed, as described by Major Rodney. The partial failure mentioned as following the march to Mankato was because this hardening process had not then been adopted. The difference that this treatment made was very marked, and nature did "harden their feet to enable them to endure the pain," just as nature

* JOURNALS for May and July, 1889.

always thickens the palms of the workingman's hands, and the soles of the barefooted West Indian portress to be mentioned later on.

But if there was any pain it was but slight, and of but short duration, as was shown by the actions of the horses themselves. They were uneasy at first, whether from pain or from the change of grade of the line is unknown, and showed their uneasiness by pawing considerably. This soon ceased, however; none went lame from the treatment, and soon they were all as much at home on this bed of rocks as they had been on the soft ground. The hoofs became hard and tough, were yet springy. The frogs grew out and rested on the ground at every step, and there was no sign of uneasiness or discomfort either while on the line, or while at work, at drill, or on the march.

Reference has been made to another point in these comments, and that is that the horse having artificial conditions imposed upon him, needs an artificial protection in the form of a shoe to protect his feet.

It is, doubtless, true, and is freely conceded, that he has more work to do with his feet when used under the saddle or in harness than when free from all burden. But does it follow that nature is not equal to the task of supplying material to make good the extra waste? Doubtless something must be done to stimulate the foot and cause an increase in circulation so as to supply the extra material. Doubtless, also, the horse's foot should be habituated to the work it has to do, and be always maintained in a condition fit for the work. That is just what they are put on the stone picket line for, to keep up a stimulus and wear away the horn as it grows, and, at the same time, as will be the case, to cause the new material secreted to become harder and harder, tougher and tougher, until at last the hoof sustains itself in a hard, tough and durable condition.

Call this an artificial condition if you please, it is no more so than is the hard condition of the palm of the mechanic or day laborer, and is it not a condition more nearly approaching nature's model than is the case where the feet are on an iron shoe, thereby introducing conditions favorable for all the well-known ills that follow? I am perfectly willing to call this hardening process artificial. I am convinced, however, from long observation, that the results are harmless to the foot, and that the hardening is all the change needed to fit the horse for the artificial condition of being a beast of burden, or the extra work thrown upon him by his condition of servitude to man.

Again, reference has been made to this hardening process as though it might be injurious to the delicate parts of the foot, and thereby entail endless pain and misery on our horse.

Paradoxical as it may seem, this hardening process is used expressly as a protection to, and means of, stimulating and strengthening these same delicate and harder parts. These parts are all *internal*, not an *external* part in the natural hoof being sensitive to pain, and they are so related to, and connected with, the hard external parts that the harder these latter are the better to give the practice needed. Being hard and tough the sole will not then give or be dented by every stone to cause pain to the internal sole and frog. The frog becomes dense and tough and springy, and gives to all pressure like a piece of rubber, and hence absorbs a greater part of all the shock of the step. The wall will be firm and hard to be able to stand shocks and blows, and cause no pain to be felt by the internal wall, or the front of the coffin bone, and, what is of the greatest importance, the whole internal foot will be maintained in its natural and healthy condition; the secretory organs will supply the necessary material to keep all the parts that call for such a condition, soft and springy, while all the moving parts will be kept well lubricated so as to be able to move upon themselves without pain or stiffness.

The Indian pony has been mentioned as a type of horse that is natural as to feet and that yet cannot stand work, when severely used, when forced rapidly over rough

mountain trails, without breaking down from sore and bleeding feet. But I will venture to say that no one yet ever saw an Indian pony with feet that had been purposely hardened. We all know that this pony is left very much to himself by his savage master, and, in fact, is most villainously abused and neglected. He is starved in the winter, getting nothing but what he can "rustle," and now and then some cottonwood brush that is cut down for him. He is used hardly on all occasions when he is used at all, and his feet, as well as the rest of his body, cannot do less than suffer and become weak and enfeebled from his stunted condition, and the poor and impoverished character of his blood.

Besides this he is so much the servant of man, and is so much attended to by his savage master as to prevent him from having the freedom of sweep of the wild horse. No more than our horses can he please himself as to his habitat or pasture. His feet are generally no harder nor more natural than those of our colts, for turf of the upland, the lowland of the river bottom, and but rarely the rocky mountain side are his home, and he has feet to correspond, that of course, cannot stand the severe work of flight over steep and rocky mountain trails. His very inability to stand this work is thought to be convincing proof of the necessity for the hardening process. The same might be said of the Japanese horse, mentioned by Col. Hamilton, in his article in the *Army and Navy Journal* of May 11th, 1889. We read of the use of straw sandals to protect their feet on rocky and mountainous roads, these sandals being used whenever a particularly bad piece of road is met, not to protect an already tender or bleeding foot, so as to enable the horse to travel; but, on the contrary, to protect the foot from undue wear on this particularly hard or gritty road, the sandal being removed and thrown away when worn out, or when softer road is met, and the extra protection is not needed. But we do not know what treatment those feet receive when the horse is athome and is at rest. We do not read in any of the articles on Japan that treat of horses, that their feet have been purposely hardened; and it is thought that it may safely be said that such treatment is not used, for otherwise it would be mentioned.

In this article of Col. Hamilton's, mention is also made of the feet of the horses he saw in Mexico years ago, as well as of the cobble-stone stable floors which he found on examining into the subject. We also find mention of the fearless manner in which the horses were ridden over paved streets and the manner in which the hoofs rung as they clattered over the stones. I have seen just such feet, have ridden horses in just such a manner, and there was no thought of any damage being done by such riding. The treatment they had received was similar to the cobble-stone floor of the Mexican stable. This article shows that the hardening process was in vogue in Mexico years ago, and that the results were as stated, and is confirmatory of what I have seen as well as read. In every case where the hardening process had been used and had been persisted in, success was the result. When it was not used, no matter how natural otherwise the foot might be, inevitable failure followed.

In this connection it may be permissible to refer to an article recently published in *Harper's Magazine* on the subject of the female portress of the West Indies. This article tells us of the travel and work performed by these carriers. It distinctly states that they travel barefooted, and, from young girlhood up, gradually acquire the strength of limb and hardness of foot necessary for carrying weights up to one hundred and fifty pounds, over distances almost beyond belief, ranging as high as fifty miles per day; not as an exceptional feat, but as a regular daily occurrence. No mention is made of any of these porters being laid up from becoming foot-sore, but the contrary mention is distinctly made of the fact that "the soles of her feet are toughened so as to

feel no asperities, and present to sharp pebbles a surface at once yielding and resisting, like a cushion of solid caoutchouc."

Now, if the human foot can stand such work uninjured, work which is of the most severe type, for the female carrier travels, not at a dawdling walk, but at a rate that would soon tire out any but the most tireless of pedestrians, up hill, down dale, in seasons both wet and dry, and over a hard, gritty limestone highway—then why cannot the horse's foot do the same? It is fitted by nature to stand just such work. It has, in the natural foot, a large, tough, springy cushion in its frog upon which to tread, a cushion that will wear out no more rapidly than the bottom of the human foot; most of the pressure will come upon this frog if it is allowed to grow and expand, and be as nature intended it to be, and the bone of the wall and sole can be made, and will become, hard and tough if properly treated, able to stand all the wear that comes upon it in the effort of propulsion, and that will be the main wear to which it will be subject, and certainly as able to stand this wear as is the human foot.

And who has not read of the custom of the European peasant, traveling to market on market days. They carry heavy loads at times, and for long distances, and they travel barefooted until about to arrive at the market place.

Then, and there only, do they stop and put on thin shoes so as to complete their holiday attire, and not because the shoes are necessary. Daily, also, they work and travel barefooted, and only wear shoes for dress occasions. Their economy and thrift prevent the useless wear upon shoes that are an expensive luxury, and hence the shoes are carried until the time arrives to complete their toilets, and then, and only then, are they put on.

Hence, we see that in "innumerable instances in the daily routine of civilized existence," in cases "when artificial conditions and requirements are imposed," man does not need an artificial protection for his foot, and man, when used as a beast of burden, can and does travel uninjured with nature's apparatus, and nature does not fail him. It is, therefore, thought that the "quick moving soliped," as well as biped, or any quadruped for that matter, can do the same if man will let nature alone, or assist her in a proper manner in keeping the feet in proper order.

Captain Godfrey unconsciously emphasizes this point in his article. He gives evidence as to the additional surefootedness of the barefooted horse; but he also gives evidence as to how their feet rapidly broke up when put to work upon the cavalry plain at artillery drill. But it must be remembered that these horses had been previously shod as a constant habit and had feet to correspond. Presumably their feet were not in a natural condition when used at artillery drill, for not enough time had been given for nature to undo the mischief resulting from the shoeing, and of course the feet broke up as was to be expected, and they had to be re-shod.

Then, again, after the drill was over, the shoes having been again removed, these horses were put in a rocky pasture, and their feet broke up again. It should have reasonably been expected that they would, for again the transition was too violent. Had these horses been re-shod simply with two plates, or three-quarter shoes of steel, set in the manner described by Captain Harris, so as to give frog pressure and pressure and wear upon the sole, and simply to have protected the edge of the wall, then the case would have been different, and I am as fully convinced as though I had seen it that their feet would have gradually assumed a natural form, and have become able to have stood the most severe service unshod.

Nor can it be claimed that here was a failure of the cobble stone, picket line or brick floored stable for hardening purposes. The horses were shod at least part of the time when standing thereon. This shoeing, in all probability, kept the feet cut down as the average shoeing does, promoted frog pressure, and kept the sole of the foot from

contact with the stone or brick. There was just enough shoeing to keep the feet in an unnatural, weak and brittle condition, so as to undo all the good that otherwise would have resulted from the wear and tear on the cobble stone or brick.

It is, of course, impossible for me to know from what source of information Colonel Bernard makes the positive assertion that the wild horse "never voluntarily goes fast over a rocky country;" or "never stands to rest on a rocky soil, but seeks the shade of trees where the earth is dry and soft." Although he says he knows this to be so, his knowledge does not agree with the information I have gathered both from reading and observation, which information is thought to be reliable.

From what I have gathered I believe the wild horse not only can but does travel voluntarily, freely and naturally over ground that is all but impassable to man. He can and does, by choice, frequent the wildest and rockiest mountain regions, and can and does, fearlessly and painlessly, climb, run, jump and travel where we are taught to believe only the goat or the chamois is at home. If this is a mistake, then the observations of travelers in Asia and India, in South America and in our own wild West are valueless, and their record only a pack of "travelers' tales."

In conversation with various officers it has been gathered that many believe in shoeing because it is recommended and practised by the best veterinary practice; that the expensive turnouts of all our fancy horsemen everywhere are all shod, and that, therefore, shoeing was the only thing to do. But, bold and presumptuous as it may seem, I beg leave to differ with this conclusion, no matter if it is backed up by the practice of centuries.

We all know how, even yet, vaccination is combatted, even though years of use have shown its benefit. Is it surprising, therefore, that non-shoeing is yet combatted when it is comparatively young, and as yet generally untried?

We all know how the practice of medicine has changed from year to year, as progress and science have discovered new remedies or new methods of treatment. I have but to refer to the present treatment for fever, as compared to that of but a few years ago, to make my point. For centuries fever patients had been denied a drink of water as certain death, in spite of the fact that patient after patient had escaped the vigilance of nurse or doctor, had drank their fill and had yet lived. Does it follow because the above had been the practice, that it was right?

Now a fever patient is fed with pounded ice, is put in baths, and every means made use of to supply the demand for moisture. Some doctor, at some time, had heeded the demands of Nature, had thrown over the practice of centuries, had adopted this practice and had saved his patient. Little by little the new practice spread, until now it is the universal and accepted method. Very well! here we have a science that has been in vogue for centuries, and that is but just now advancing into the light of reason and of truth; advancing because of the better methods obtained from the experiments and research that are the result of the advance in scientific knowledge in anatomy, physiology and chemistry, and a more close union with and knowledge of Nature's wants. Here we have a science to which the best minds of all ages have been bent, each age making use of everything and anything that would add to its store of knowledge.

Now let me ask in all seriousness, and with no desire to belittle anything, how old is veterinary science? How long has it been since the first veterinary college was established? Has this science been so long established as to be beyond learning something new? Are the best minds of the age devoting themselves to its study and practice?

True it is, that a great deal has been learned and done. All honor to those who have nobly taken up the horse for their study and their profession; but we all know how much yet there is to be done. We all know under what a heavy load this science

struggles. We all know that the social ban against the "horse doctor" has not yet been removed, and we all know that in our army our veterinary surgeons have no recognized social, or hardly any official status.

Under such conditions are we getting the best minds and the best talent to follow this science? Is the progress being made that would be made, yes, and that will yet be made, when the science more fully establishes itself? When the time comes, when it will be conceded that it takes a busier mind, and a greater talent to read the signs of disease and properly to diagnose the ailment of a dumb brute than of a talking human being; when the time comes that such minds and such talent seek the veterinary profession as a noble calling, and are not barred out by the social ban, then, and then only, can we take the dictum of that profession as we now do that of medicine or surgery, and believe that that dictum is founded upon the knowledge, the science and the experience of those we are bound to respect in every way—and not believe, as we now do, that that dictum is founded solely on ignorance and prejudice, custom and instinct.

I, therefore, make so bold as to claim, that this dictum as to horse-shoeing is not infallible. The process of hoof hardening may be yet a new and an untried method, and, therefore, one on which this profession cannot, from experience, express an opinion. Like the fever patient, burning and parching with thirst, the shod horse may find his relief and cure in stripping off his shoes and hardening his feet, as the fever patient has often and now does find relief and cure from the free use of water.

As to shoes, if it is found on trial that we must shoe, then I can only say I most heartily endorse the remarks of Captain Harris on that point. The light steel shoes he advocates, are, as I know from trial, all that the horse needs to protect the wall of his foot. The Arabs use just such a shoe when they shoe at all, and they have been successfully used in England, not alone on light road horses, but upon the heaviest of draft animals. Such shoes were used upon some of the new battery horses, as Major Rodney describes, and were a decided success.

But before we go back to the shoe, I would like to see Col. Hamilton's idea tried with this improvement: Let a rubber shoe be made that will fasten to the hoof by means of a lip, that covers a steel spring that will clasp around the wall of the hoof, and clamp on to the heel. Such a shoe can be made with a spring not so stiff as to injure or impede the horse, the sole to be made of heavy and thick, soft rubber like our bicycle tires. Stevens' tour around the world on a bicycle has shown what this rubber will stand; and then our horses could be barefooted for general service, and shod with the rubber sandals for extra hard service when needed on hard, flinty, gritty or rocky roads. The trooper, or the battery could readily carry such sandals; they need not be expensive; but even if they were, their cost would soon be more than saved by the abandonment of the iron shoe, and the saving in horses now annually condemned while in their prime, because of defective feet as the result of shoeing.

Battery F. did not march from Fort Snelling to Fort Riley, "because the powers that be" decided not. It was hoped the march might be made, and everything possible was done to that end. But for reasons probably sufficient to the directing authority we were sent by rail.

In conclusion I would give a description of the new picket line now being built at Fort Riley for our battery:

The ground was first plowed, and then thoroughly gone over to break up all lumps and clods, and to bring the surface to an even grade, with a *slope towards the centre*, as well as in the length of the line. A central ditch about 2" x 2" was dug the whole length of the line, its bottom graded so as to drain in its length, and then filled with large blocks of broken stone, to form a blind drain.

The line proper was then closely packed with large blocks of stone bedded down

into the soft dirt, the ground having been broken up, as stated, to form such a bed as well as to permit of grading. Cobble stones could not be had, and therefore the stones of the country had to be used.

The foundation then laid is covered in with a layer of smaller stones, bringing the whole up to a hard even surface and grade, with nothing but sharp rock for the horses to stand upon. A filling of sand is to be used so as to help bind the rock, and at the same time to prevent the gradual filling in of manure that would otherwise happen. By this means a hard, sharp and yet clean surface can always be maintained.

The slope to the centre is purposely given for it has been found that the horse stands more comfortably thereon. He always seeks a position sloping a little towards the head, and if forced to stand on a worse slope he soon rectifies the matter by pawing out a hole for his feet to stand in, and then is content. Fill this hole in, repair and build up the centre of the line so as to drain outwards, and he will paw it out as fast as you fill it in. Hence the slope towards the centre.

The central blind drain takes all the drainage from the line, and is made large and deep enough so that no moisture from, or pools of urine or water will stand upon the line. Moisture and muddiness from rain, from frost or from melting snow will also be prevented, and it is thought that this line will maintain itself in good condition the whole year through.

Blind drain in rear of the horses can also be made if found necessary. They need not be so large as the central drain; they would serve to collect and carry away all water that would flow towards the line from outside ground in case of a heavy rain, and also help carry away a portion of the urine or other moisture that falls upon the line.

Those blind drains are carried out and beyond the end of the line, so as to empty their contents on the surface at a distance removed from the line proper, so as not to form cesspools to collect all the liquid filth of the line.

It is thought that this line will have a most beneficial effect upon the horses' feet. They will be kept dry and hard, will be worn down naturally and this wear will keep them healthy and in a condition to stand wear and tear upon any service—and although perhaps, the experiment has not reached the stage of absolute demonstration, the result will go far to show whether our horses can or cannot do any and all service barefooted.

FORT RILEY, KANSAS, July 5, 1889.

V.

"Employment of the Military in the Suppression of Mobs."

Hon. Roger S. Greene, Ex-Chief Justice, Supreme Court, W. T.

LEUT. RICHARD B. YOUNG'S pamphlet monograph, entitled "The Employment of the Military in the Suppression of Mobs," was lately brought to my notice through a friend, who had received a copy from Brig.-Gen. Gibbon.

Since then, by kindness of Brevet Maj.-Gen. Fry, I am possessed of a copy of my own. If this treatise may be taken as a sample of the work and publications of the Military Service Institution, that organization is richly deserving of the generous encouragement and support of the press and country. The pamphlet is exceedingly creditable to its author, both as an officer and as a lawyer. His arrangement and treatment are practical and judicious, and evince not only great industry and skilfully conducted research, but an exceptional mastery of a group of principles decisive of many momentous and perplexing questions, happily never arising within the range of

ordinary rules or experience, but of the utmost concern to persons of all classes whenever unexpectedly or otherwise they do arise. I regard the work itself, and especially that part of it which is an essay on martial law, as the most comprehensive and valuable discussion, of matters within its purview, extant.

SEATTLE, WASH., July 12, 1889.

VI.

Commanders-in-Chief U. S. Army.

Brig.-General N. W. Brown, U. S. A. (retired.)

IN your last JOURNAL you give the "Commanders-in-Chief U. S. A." I think the title should be General-in-Chief.

Hall is not correct, the President is always Commander-in-Chief.

In 1815 General Brown was put in command of the Division of the North, and General Jackson the Division of the South. This was the reduction after the War of 1812.

In 1821 General Brown was put in command of the Army as General-in-Chief (not Commander). This was the reduction of 1821.

WASHINGTON D. C., July 14, 1889.

Reviews and Exchanges.

Bourrienne's Napoleon Bonaparte.*

"**S**AVE me from my friends and I can take care of my enemies " applies forcibly to these newly-edited memoirs. The only value credited to the memoirs of a confidential private secretary is that they are a quasi-confession of the master's secrets. This confession is made the covered vehicle to reach the hundred days' downfall of Napoleon and crowning glory of England. The lovers of historic truth will no more credit the coloring of an Englishman's fair play than that of the poor old, half-demented ex-private secretary, galled by poverty and mortification to foreswear his word of honor, that his hand should wither before he would write against his master's confidences."

The historian has not been found for Napoleon, and will not be found until the prejudices of men fade into the pure atmosphere of philosophic reason. Metternich, Talleyrand, Rémusat, Bourrienne, Meneval, etc., wrote from this standpoint of prejudice, and each gave but a side view of this many-sided object. All that pertains to that view should be preserved and (prejudice being eliminated) used as material to build up the character, conduct and personal endowments of Bonaparte philosophically. But his history can be faithfully written only from the standpoint of revealed religion, as was that of Abram, Moses, David, Cyrus and Alexander of ancient history. The plan of writing the history of such a man, and leaving out God, was not that of Homer's, of "Achilles Wrath," or Virgil's, of "Arms and the Man," and will never contain truth philosophically stated.

If the fall of the sparrow is noted by the omniscient, will not the doings of the greatest of earth's creatures be directed? Does God endow a man with extraordinary genius (which is nearest to the soul) and make no use of that godlike power? Is genius only the attribute of Satan, which men fear and worship? Cyrus, though a heathen, was called the chosen of God in Biblical history.—"He is my shepherd and shall perform all my pleasure." The prophets wrote of the Kings of the East and of the West, who should sweep back and forth across the face of the earth, disseminating the knowledge of the living God. Had Bonaparte no part to play in the divine work? The agency of man in the dissemination of divine truth is treated of in the Bible, from Noah to Christ. Did divine history cease with the Bible? Why not accept the salient fact that kings were given to the house of Israel as a punishment for doubting the wisdom of the divinely-appointed judges, and Saul succeeded Samuel only to contrast the effect of the methods of God and man. David and Solomon were agents, with the title of kings, but they often stumbled. The sin of David was the birth of Solomon. The title of king brought the house of Israel into bondage. The claim for kings by divine right became the sin of the world. Why not premise that Bonaparte was endowed with a genius to eradicate this mistaken faith, by contrasting heredity and

* *Memoirs of Napoleon Bonaparte, by Bourrienne.* Edited by R. W. Phipps, Colonel late Royal Artillery. New York: Scribner's, 1889.

genius, one the accident of earthly, the other the spirit of heavenly, power. Take the major premise—Bonaparte was endowed beyond all men of his time for a purpose; and for the minor premise—the purpose was to eradicate from the faith of man the assumption of the divine right of kings. The argument of his career (up to the time when he, like Moses at Meribah, assumed to himself the power of which he was but the agent) would agree with his history; and the conclusion would be drawn from his relations to the crowned heads of Europe. Consider, also, that he was preceded by Washington, who recognized and fulfilled his agency, but whose sphere of influence was too far from the centre to have the full effect without the meteoric glare of Bonaparte's career over the face of the Old World. The seed of the new faith was sown, however, and France to-day bows to no king but God, and all nations have a legislative government for the people. The English editor of Bourrienne supplements the *Memoirs* with the hundred days, to point the moral of English glory over the fallen genius. Napoleon had forfeited his agency, lost much of the confidence of his people and his soldiers, and the fealty obedience of his generals. His history cannot be measured by the standard of the hundred days. The rays of his genius shone like the colors of the dying dolphin.

Of course, the Englishman takes the side of Ney and Grouchy, to lay the blame on Napoleon, and threshes over the old straw stacked up by his enemies when he was in exile; but no unprejudiced soldier to-day will allow the commander on the spot to shift the responsibility of his failure to succeed in his task. The "bravest of the brave," never before halted five hours in front of an enemy, 9000 strong who held a post he was ordered to occupy with 30,000 men, as he did at Quatre-Bras. Think of Sheridan halting when the enemy had broken, and searching a part of two days for Grant, to know if he should follow, and by what road, as did Grouchy after Blücher's defeat at Ligny. No, Mr. Partisan of Wellington (who said, would to God that Blücher or night would come). You cannot use the character given Napoleon by his disgruntled ex-Private Secretary as leading up to the loss of Waterloo. Napoleon did not lose the battle of Waterloo; it was lost by Ney at Quatre-Bras, or there would have been no battle of Waterloo—it was lost at Waterloo because Grouchy allowed Blücher to come and win it. Let the standard of Napoleon's history be measured entirely by the times when he was attacked by all the kings claiming divine right, Marengo, Essling, Jena, Austerlitz—"The Code Napoleon"—The National Institute of Science, when masters of all profession acknowledged him as superior in their own. Let history treat him as his works demonstrated, not by the gossip of his household as to his intentions, or utterances in idle or angry moments. "A prophet is not without honor save in his own household." Let his history be treated as that of a representative man of genius who acted his part in the agency given him, was tempted and fell (the raft of Tilsit was his rock of Meribah) as had fallen all of the biblical agents before him save Christ alone, who was Himself God. Napoleon's utterances at St. Helena concerning the God-head stamp him prophet—"Paganism is the work of man; Lycurgus, Confucius, Mohammed and the Gods, I recognize as beings like myself, legislators, law-givers (nothing announced them as divine) with fables and errors which ally them to humanity. It was not so with Christ, everything in Him astonishes me. His spirit overawes me, and His will confounds me—between Him and whoever else in the world, there is no possible term of comparison. * * * His Gospel, His Apparition, His Empire, His march across the ages and the realms—everything is for me a prodigy * * * a mystery which I can neither deny nor explain."

From the decay of Napoleon's ambition grew the germ of the Faith. Had he realized of Christ at Tilsit that His kingdom was not of earth, he could have realized *Vox Populi, Vox Dei*.

WM. W. BURNS.

Instructions for Courts-Martial.*

This handy pamphlet will, undoubtedly, be of great use to military courts, and to the young officers who are detailed for judge-advocates in the Department of the Missouri. Every department should keep on hand one of a like nature, and, we believe, nearly every department does so. And they should be reprinted from time to time, with such emendations and additions as experience shows the need of. The first one issued was prepared, it is believed, by that accomplished officer, Lieut.-Colonel T. F. Barr, while judge-advocate at the headquarters of one of the departments; and the advantages of the manual were seen at once to be so great, in systematizing the methods of military courts, and in introducing a uniformity of procedure where diversity had been the rule, that his example was speedily followed.

The manual under review is an enlargement of Colonel Barr's, and is based on that; as it necessarily had to be. It is amplified considerably by the introduction, in detail, of instructions for procuring the attendance of witnesses and their payment; the duties of officers when served with a writ of habeas corpus; the Articles of War under which enlisted men can be brought to trial; general forms to aid in the preparation of charges; forms of summons, subpoenas, attachments, depositions and certificates; and a series of comparative tables of sentences awarded by general and garrison courts during the past three years in the Department of the Missouri; of interest as showing the variety of views upon appropriate severity of punishment entertained by different courts.

We are glad to see that Captain Murray is not bitten by the maggot which has impaired the judgment of several men of otherwise large ability and good sense, on the subject of the 103d Article of War as applied to desertion; and that he does not appear to hold that a deserter, who has hidden two years in an attic, or under an alias in another regiment, has a right to emerge from his obscurity without danger of arrest; and, as one deserter did in General Townsend's time, report the circumstances of his escape from detection, and request a clerkship in the Adjutant-General's office.

Among the forms of sentences given by Captain Murray on page 41 of his manual, we fail to find one adapted to the efficient punishment of *retention of pay*, now authorized in G. O. 63, of 1889. We venture to supply the want: * * * "and to have retained from him by the U. S. ten dollars per month of his monthly pay for — successive months, the amount so retained to be paid him on final statements on his discharge from the Service."

The form of affidavit given on page 64 seems to be defective, in not stating who it is who personally appears, etc.

In dealing with the subject of depositions on page 28, Captain Murray states that the person before whom the deposition is to be taken, "shall be a notary public, justice of the peace, or some civil officer competent to administer oaths in the State, Territory or District in which the deposition is to be taken."

A newspaper report of a recent decision of the U. S. Supreme Court may have a bearing upon this point. It is the case of *U. S. vs. John D. Hall*, indicted for perjury and making a false oath before a notary public as to his services as Deputy U. S. Surveyor. The court decided that a notary public is not authorized to administer oaths in such cases, and holds that where an oath is required by a U. S. statute, such oath can be administered only by an officer of the United States. Hence, it says: a notary public being a State officer, cannot administer oaths to U. S. officials, unless the statutes specifically state that such oath may be made before such State official.

* *Instructions for Courts-Martial and Judge-Advocates*. Prepared by Captain Arthur Murray, Acting Judge-Advocate, U. S. A. Headquarters Department of the Missouri, July, 1889.

The foregoing report may be incorrect, or the decision may not be applicable to oaths taken by deponents for use in military proceedings. We cannot reach a conclusion without a fuller statement of Hall's case.

King's Military Novels.*

Two more, clever, wholesome, military novels from the pen of the gallant American cavalryman who has already introduced us to "The Colonel's Daughter," made us admire "Marion's Faith," and given us an insight into the romance of "From the Ranks." One is impressed with the rapidity of production, and the quality of Captain King's literary work.

A prolific brain does not, necessarily, imply intellectual vigor nor ripeness in its fruit. Nevertheless, in following the fortunes of the "Queen of Bedlam," we fail to detect any falling off in construction or treatment. One of the strongest features of the King series is realism. The characters are real flesh and blood, moving in a real military atmosphere, described by one who has inhaled it in fact and exhaled it in the form of fiction. The "Queen of Bedlam" is a frontier garrison sketch, replete with what artists call "action." We have heard some critics, jealous of the social repute of the Army, claim that the author dwells too strongly upon the shadows, the puerilities from which no social system is exempt, and that thereby an unpleasant impression is made upon the civilian reader. But there must always be "a villain in the play;" "pride, vain glory, hypocrisy, envy, hatred and malice," are necessary ingredients in every life-like tale, and we may safely trust, perhaps, to Captain King's loyalty to the Service to keep in check his literary enterprise.

No such fault can be found with "Between the Lines," a compact little story redolent of camp and field in our great War. The routine of the Regular is replaced by the stirring life of the Volunteer when moments seemed hours, and hours, days, and days comprised the experience of years in time of peace. The thread of a love story is here dexterously interwoven with the incidents of Pope's "Second Bull Run" campaign. The author's advantage over the civilian novelist is shown in the absolute accuracy with which the minutest detail of Service and the outlines of great operations are delineated. For this reason "Between the Lines" is no less instructive than entertaining. The publishers have bound each in a "full dress," which is richly deserved.

T. F. R.

Battle of the Big Hole.

In the "Battle of the Big Hole," Mr. G. O. Shields ("Coquina") gives an exceedingly interesting description of one of the most desperate fights in the history of our Indian wars. He gives his readers a very accurate idea of some of the hardships necessarily overcome in such Western campaigns, and takes occasion to eulogize, in no faint terms, the American soldier in general, and Gen. John Gibbon in particular.

Statistics are given to show, that out of Gen. Gibbon's little band of less than two hundred men, twenty-nine were killed, and forty wounded, while from Chief Joseph's admission after his capture, he lost more men in killed alone than there were, all told, in the soldiers' ranks at the commencement of the fight.

The Nez Percés were among the bravest and most intelligent of our Indian tribes, and this little book will, if it does nothing else, serve to rescue from oblivion, the history of a fight in which excellent generalship aided by American pluck and bravery overcame, against almost overwhelming odds, a savage but formidable foe.

E. M. L.

**The Queen of Bedlam*. By Capt. Charles King, U. S. A. Phila., J. B. Lippincott & Co., 1889.

**Between the Lines*. By Capt. Charles King, U. S. A. New York, Harper & Bros., 1889.

"Military Miscellanies" is the title of a book by Gen. J. B. FRY, U. S. A., which will soon be issued from the press of the Messrs, *Brentano* of New York, Washington and Paris. In a handsomely printed octavo volume of nearly five hundred pages, will be found a collection of short papers on a variety of technical and historical topics treated clearly, concisely and forcibly. The technical chapters under the several heads of "Notes on Theoretical and Practical Military Matters," "The Command of the Army," "Justice in the Army," "Law in the Army," "Obedience in the Army and Navy," "Justice for the Army," "The Honor of the Army," "A Military Court of Appeals," "An Elastic Regular Army," "Admission to the Military Academy," "The Militia," are grouped in Part I. of the work, and cover an extraordinary amount of painstaking research and practical experience by an officer of long service in the staff and line of the Army. Part II. comprises much interesting historical and biographical material and professional criticism of some of the military men and measures of the Civil War. These sketches are entitled, "Abraham Lincoln," "An Acquaintance with Grant," "Grant and Matthew Arnold," "Halleck and Grant," and contain the personal reminiscences of the author, whose duties in the Adjutant-General's Department in the field and as Provost Marshal General of the Army during the War, brought him closely in contact with the famous men of the time. The remainder of the book is devoted to interesting military studies of certain battles of the Rebellion, and criticism of published accounts of some of the participants.

From a glance at the advance sheets of "Military Miscellanies," we do not hesitate to say that, in our opinion, it may form an important part of the equipment of every commanding officer; also of those who *make*, as well as those whose duty it may be to *execute*, military laws. The technical part is a remarkably comprehensive digest of the theory and practice of the Service from its original establishment to the present time. It is unfortunate that the edition is limited to three hundred copies, printed from the type. It will be issued early in September.

Gettysburg Monuments continue to increase in number, beauty and strength. The one recently erected upon the spot where the Sixth Pennsylvania Cavalry, Reserve Brigade, First Division, Cavalry Corps, Army of the Potomac, helped to neutralize the force of Pickett's celebrated charge, on the third day of the battle, is one of the latest and best of this class. There is an especial significance attached to this memorial in that it marks one of the most important services yet rendered by modern cavalry on the battle-field; a service the nature of which has only just been recognized by cavalry students, and clearly and forcibly demonstrated by Colonel Frederick C. Newhall in his address at the dedication of the monument, October 14, 1888. Colonel Newhall has a distinguished record as a cavalryman and a reputation as an able military writer. His "With Sheridan in Lee's Last Campaign," is a text-book in one of the great military academies of France. His fitness as one of the cavalry historians of Gettysburg is unquestioned. Colonel Newhall's concise address has been published by the survivors of his gallant corps, the "Lancers," a regiment whose casualties at Beverly Ford (June 9, 1863,) number one hundred and forty-seven, and whose steadiness under fire, on that field, won from the Division commander—the undemonstrative Buford—the proud sobriquet of "The Seventh Regulars."

As already indicated here, Colonel Newhall has taken the opportunity of combining an outline of the services of this regiment during the campaign within the more important part taken by the brigades of Merritt and Farnsworth, in threatening the extreme right of Lee's Army, in the final struggle for victory at Gettysburg. As a rule,

dedicatory addresses are more apt to be marked by rhetorical flourish and "mutual admiration" than by new historical discoveries. The monograph noticed is one of the exceptions.

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- Elements of the Art of War.* By James Mercur, Professor of Civil and Military Engineering at the U. S. Military Academy, West Point, N. Y. Second Edition. New York. John Wiley & Sons, 1889.
- Between the Lines.* A Story of the War. By Captain Charles King, U. S. A. Illustrated. New York. Harper Bros., 1889.
- Instructions for Courts-Martial and Judge-Advocates.* Prepared by Captain Arthur Murray, Acting Judge-Advocate, U. S. A. Fort Leavenworth, 1889.

OUR EXCHANGES.

ARTICLES OF MORE OR LESS MILITARY INTEREST.

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- Journal of the Royal United Service Institution.* (Vol. 33, No. 148.) Military Prize Essay. Subject: "Discipline; Its Importance to an Armed Force, and the Best Means of Promoting and Maintaining It." Forage for Military Purposes. Employment of Dogs for Military Purposes. The Soldier's Food, with Reference to Health and Efficiency for Service. The Recent Changes in the Drill of the German Army. Recent Inventions in Gunpowder and Other Explosives. The Column *vs.* the Line of the Formation for Moving Reserves in the Infantry Attack.
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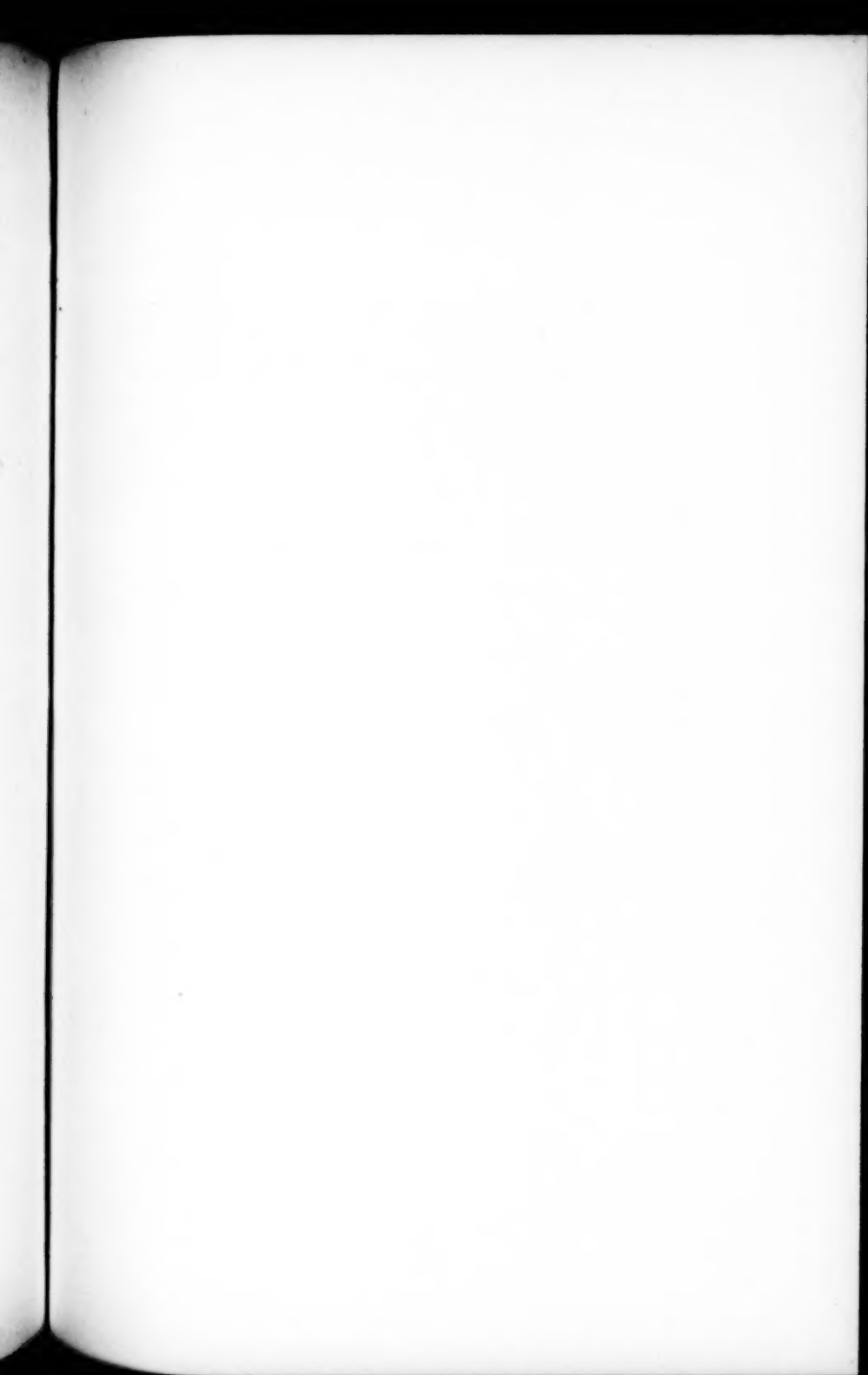
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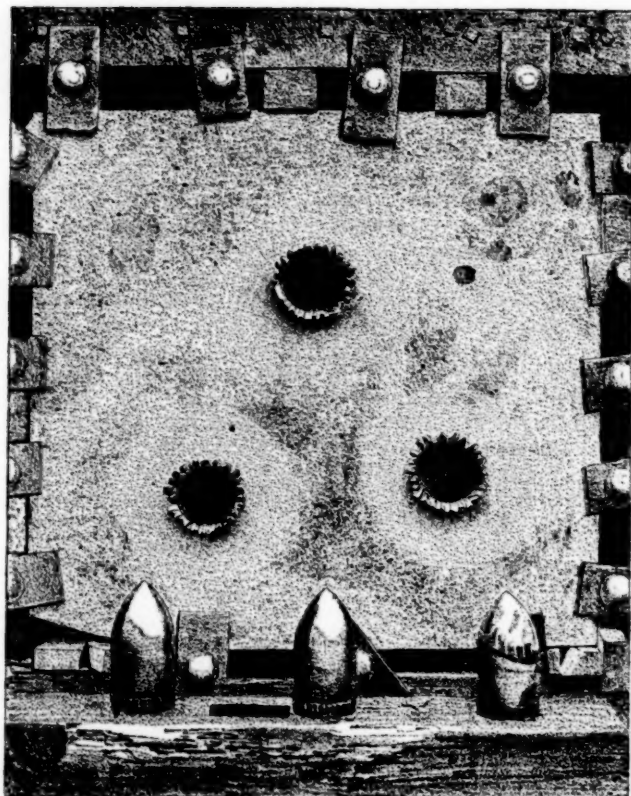
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EFFECTS OF PROJECTILES ON ARMOR PLATES.

(FROM THE ENGINEER, LONDON.) SEE PAGE 738.

THICKNESS OF PLATE $10\frac{1}{4}$ INCHES. DIAMETER OF SHOT 6 INCHES.